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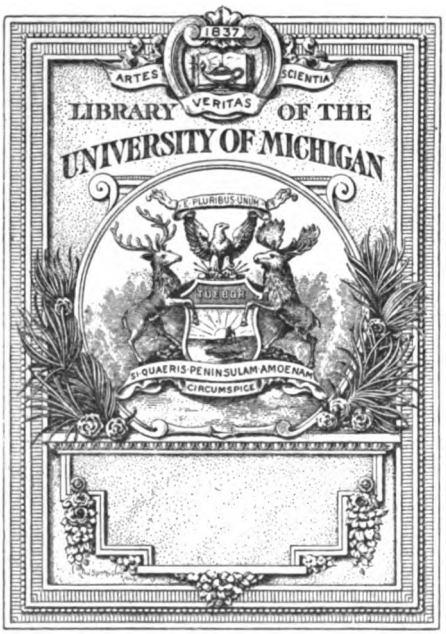

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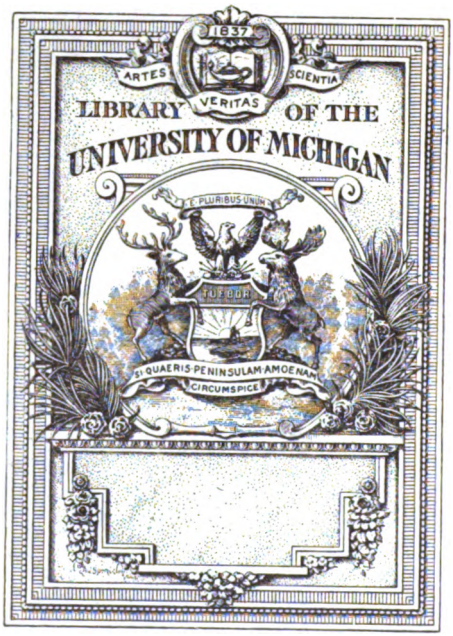

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War Department, U. S. A.

Annual Reports, 1907

(IN TEN VOLUMES)

Volume VIII

Report of

THE PHILIPPINE COMMISSION

(IN THREE VOLUMES)

Volume II

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- CHIEF QUARANTINE OFFICER
- DIRECTOR OF FORESTRY
- DIRECTOR OF BUREAU OF SCIENCE
- DIRECTOR OF LANDS
- DIRECTOR OF AGRICULTURE
- DIRECTOR OF WEATHER BUREAU

SECRETARY OF COMMERCE AND POLICE—
- DIRECTOR OF CONSTABULARY
- SUPERVISING RAILWAY EXPERT
- DIRECTOR OF PUBLIC WORKS
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- DIRECTOR OF POSTS
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[a] Printed in Report of Chief of Engineers, Vol. V.
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REPORT OF THE SECRETARY OF THE INTERIOR.

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REPORT OF THE SECRETARY OF THE INTERIOR.

DEPARTMENT OF THE INTERIOR,
Manila P. I., October 28, 1907.

GENTLEMEN: I have the honor to present the sixth annual report of the operations of the department of the interior, which, unless otherwise expressly stated, covers the year ended June 30, 1907.

ORGANIZATION OF THE DEPARTMENT.

The only important change in the organization of the department is the transfer of the division of ethnology from the bureau of education to the bureau of science. At the time the bureau of non-Christian tribes was abolished, provision was made for continuing its work by creating a division of ethnology in the bureau of education. This action was taken in the hope that ethnological investigation might be carried out by school teachers during vacation periods and at other times, and that economy might thus be achieved.

The former bureau of non-Christian tribes not only carried on investigations relative to non-Christian tribes, with a view to gaining information which was of scientific interest or might serve as a basis for legislation and administration calculated to better their condition, but, under the direction of the secretary of the interior, made such investigations as he deemed necessary into the practical operation of existing laws for the government of such tribes and into the conduct of those who governed them. The transfer of this work to the bureau of education left the secretary of the interior in a somewhat anomalous position. He had executive control over five provinces organized under the special provincial government act, and largely populated by non-Christians, and he was vested with authority to approve or disapprove the acts of governors and provincial boards relative to the non-Christian inhabitants of all other provinces except the Moro Province, but was left without agents to make such investigations as he might deem necessary, and was thus forced to depend upon the courtesy of another department for assistance which was essential to the proper performance of his duty. This fact, together with the further one that expectations as to the ability of school teachers to perform ethnological work were not realized, led to the transfer of the division of ethnology from the bureau of education to the bureau of science. This change places it where it logically belongs, in view of the fact that one part of its work is strictly scientific while the other part is necessarily carried on at the request, and usually under the direction, of the secretary of the interior.

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INSPECTION OF PROVINCES.

Section 29 of act numbered 1396 (special provincial government act) imposes upon the secretary of the interior the duty of inspecting at least once during the fiscal year each of the provinces organized under said act.

This inspection for the year ending June 30, 1906, was completed in April. Further inspection would therefore not have been timely in the early months of the year beginning July 1, 1907, nor would it then have been practicable in Benguet, Lepanto-Bontoc, and Nueva Vizcaya on account of the interruptions to overland travel incident to the rainy season.

NORTHERN INSPECTION TRIP.

On October 15, 1906, the secretary of the interior sailed for the United States on six months' leave, and upon his return, on April 14, 1907, found that his presence was required immediately at Baguio in order to make a quorum of the Commission. It was not until May 22 that he was at liberty to start on his annual tour of inspection. His first trip, which was made in company with the governor-general, began at Baguio, Benguet, on this date, covered the provinces of Benguet, Lepanto-Bontoc, and Nueva Vizcaya, and ended at Manila on June 24. As it was manifestly impossible to complete the inspection of Mindoro and Palawan in the remaining six days of the fiscal year, and as other duties made the presence of the secretary of the interior at Manila necessary at this time, the inspection of the last-named provinces was delayed, but it was completed on October 3, 1907.

PUBLIC ORDER IN BENQUET, LEPANTO-BONTOC AND NUEVA VIZCAYA.

Conditions in Benguet, Lepanto-Bontoc, and Nueva Vizcaya were found to be quite satisfactory. The people of these provinces are contented and fairly prosperous. Their townships and settlements are for the most part reasonably well governed, and the state of public order leaves little to be desired. There have been but a very few isolated cases of head-hunting during the year. At the time of the downfall of Spanish sovereignty the trail between Bagabag and Carig was protected by four permanent garrisons and travelers were allowed to pass over it only under convoy, on account of the danger of attack by head-hunters. At present there is no garrison anywhere on this trail and women may be met passing over it unattended.

PUBLIC IMPROVEMENTS IN BENGUET, LEPANTO-BONTOC AND NUEVA VIZCAYA.

Under the operation of the law imposing a public improvement tax, means of communication are being rapidly improved. In Benguet all but one of the fords which have heretofore interrupted traffic northward along the so-called "river trail" during the rainy season have now been eliminated by the construction of bridges, and the "hill trail" between Baguio and Cervantes, which follows a high divide throughout nearly its entire extent and is always free from interruption by swollen streams, is being steadily pushed toward completion.

In Lepanto-Bontoc the new trail to the coast has been completed as far as the boundary of the municipality of Tagudin and will

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soon reach the sea. This trail is 30 miles long and its grade nowhere exceeds 6 per cent. It crosses but two streams of any considerable size, and these can be bridged readily. The trip from Cervantes to the sea can now be made in one day. The trip over the old trail usually occupied two and one-half days, and involved the climbing of many steep grades as well as the crossing of 13 fords, many of which became impassable for considerable periods during the rainy season.

Road work has also been pushed in the eastern part of Lepanto-Bontoc. The main trail north from Bontoc has been extended to Guinaan and Balbalasan, a distance of 80 miles. The trail to the top of Polis Mountain, on the way from Bontoc to Banaue in Nueva Vizcaya, has been improved and a good rest house has been built at its highest point. The old trail from this latter point to Banaue, with its steep ascents and heavy adverse grades, can soon be abandoned, as a new line has been surveyed which descends steadily on a grade of 6 per cent or less, and a trail along this line is rapidly approaching completion. The trail from Bagabag to Quiangan has been widened and greatly improved. In fact, as far as Payoan it is now practically a cart road.

The trail from Bagabag to the Isabela boundary has been greatly improved and could be converted into a cart road at comparatively small expense. Unfortunately, the Christian province of Isabela has done nothing to improve, or even maintain the trail and highway which formerly led from the provincial boundary of the towns of Cordon, Carig, and Echague. This is the more difficult to understand, as these towns are largely dependent upon Nueva Vizcaya for their rice. It is to be hoped that this situation, which results in bottling up the agricultural products of Nueva Vizcaya, can soon be remedied.

NEW BOUNDARIES FOR AMBURAYAN.

The recommendations embodied in the last annual report of the secretary of the interior relative to the establishment of new and more definite boundaries for the subprovince of Amburayan and the incorporation of the municipality of Tagudin with that subprovince as its capital have been carried out. An end has thus been put to many troublesome questions which caused friction between the provincial authorities of La Union, South Ilocos, and Lepanto-Bontoc, and adequate protection has been provided for the Igorot residents of La Union, many of whom had long suffered grievous abuses at the hands of their Christian neighbors.

ESTABLISHMENT OF THE SUBPROVINCES OF KALINGA AND APAYAO.

As recommended in the last annual report of the secretary of the interior, two new subprovinces, known as "Kalinga" and "Apayao," have been established. Kalinga appertains to the province of Lepanto-Bontoc and includes, roughly speaking, all the territory west of the Rio Grande de Cagayan inhabited by Kalingas, as well as the Saltan River valley, the upper part of which is peopled by wild Tinguians. Apayao, which forms a part of the province of Cagayan, includes all the remaining territory inhabited by wild tribes between the northern boundary of Kalinga, the Rio Grande de Cagayan, the

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crest of the Cordillera Central, and the China Sea at the northern extremity of Luzon.

Señor Blas Villamor, who had previously served as governor of Abra and of Isabela, has been made lieutenant-governor of Apayao, and has already begun his work there with signal success.

Lieutenant-Governor Walter F. Hale of Amburayan, has been transferred to the subprovince of Kalinga, his work in Amburayan having merited this promotion. Thus far he has been able only to make a hasty trip through his new subprovince, it having been necessary for him to return to Amburayan in order to complete unfinished business.

The task before each of these lieutenant-governors, involving as it does the establishment of law and order among warlike peoples over most of whom no governmental authority of any sort has heretofore been exercised, is by no means easy, but it is believed that both are competent to perform the arduous duties imposed on them, and that in the not distant future, conditions as satisfactory as those which now prevail in Bontoc and Nueva Vizcaya will be brought about in Kalinga and Apayao.

UNGOVERNED TERRITORY IN NORTHERN LUZON.

The only part of Luzon in which there now exists no machinery for the exercise of governmental control over the inhabitants is the eastern Cordillera, from the vicinity of Baler and Casiguran northward to Cape Engaño.

According to the best information obtainable, this great unknown region is sparsely inhabited by negritos. The undersigned hopes personally to investigate conditions there at some time in the near future.

ESTABLISHMENT OF THE PROVINCE OF AGUSAN.

It has long been well known that deplorable conditions requiring remedial action existed among the non-Christian and "new-Christian"[a] inhabitants in the provinces of Surigao and Misamis in the island of Mindanao; but until the task of establishing government over the more important tribes of northern Luzon could be completed, it seemed impossible to enter upon the work so urgently necessary in northern Mindanao.

As soon as practicable after provision had finally been made for the organization of the subprovinces of Kalinga and Apayao, further investigation into conditions in Surigao and Misamis was undertaken, and act No. 1693, which among other things creates the province of Agusan and the subprovinces of Butuan and Bukidnon, was passed on August 20, 1907. This act cuts off from the province of Misamis all territory inhabited by members of non-Christian tribes and makes of it a subprovince called Bukidnon from the name of the most important tribe inhabiting it. There are, however, some Subanos and a considerable number of Manobos in this subprovince.

All the former territory of the province of Surigao west of its eastern mountain chain was cut off and made the subprovince of

[a] "New-Christians" is the name commonly applied in the Philippines to the members of non-Christian tribes who have recently received baptism.

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Butuan. The subprovinces of Bukidnon and Butuan together form the province of Agusan.

Included within the territory of Butuan are three Christian municipalities. One of these, Talacogon, has but about 1,000 inhabitants and should never have been organized as a municipality, as it has neither men competent to hold office nor funds sufficient to maintain a municipal government. It will speedily be reorganized as a township. The other, Butuan, has well earned the reputation of being the worst-governed municipality in the Philippine Islands. Its inhabitants have now been given a reasonable time in which to put their town in a decent sanitary condition and to reform their municipal government, and have been warned that failure to do these things within the prescribed period will result in the reorganization of Butuan as a township. The third municipality, Cabadbaran, is well governed and prosperous. It was included in the province of Agusan because communication with Butuan will be far easier than with Surigao and because it is so surrounded by territory inhabited by non-Christians that any other disposition of it would involve much difficulty in establishing a satisfactory provincial boundary between Surigao and Agusan.

Among the reasons which led to the establishment of the province of Agusan the following may be mentioned:

Not one cent of the funds made available by the insular government for bettering the condition of the non-Christian inhabitants of Surigao and Misamis had ever been expended, the provincial boards and provincial governors having allowed them to accumulate without making the slightest effort to use them for the purposes for which they were set aside.

Not the slightest effort had been made in either province to enforce the law prohibiting the sale of alcoholic drinks to members of non-Christian tribes. On the contrary, such sale was carried on openly and upon a large scale in the capital of Misamis under the very noses of the provincial authorities.

Little if any effort had been made by the local authorities to check the smoking of opium, which is on the increase.

In Misamis no provincial governor had ever so much as visited the settlements of non-Christians or of new-Christians, although all of the latter could readily be reached on horseback in one to four days. Many of these settlements had been left without any officers whatever, and the most that had been done in any case was to appoint, in a perfunctory way, a president, vice-president, and councilors. These unfortunate officials served without pay and without any instructions as to their duties.

In Surigao nothing whatever had been done for the hill people. The settlements of "new-Christians," under the pretext that their inhabitants, having been baptized, were no longer members of non-Christian tribes, had been made "barrios" of the two municipalities of Butuan and Talacogon, and had in effect, been turned over to these municipalities for plunder. In both provinces the non-Christian and "new-Christian" inhabitants had in many instances been shamelessly robbed of their agricultural products, or if paid something for them, had received but a small fraction of their value.

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The following schedule of values commonly paid at Cagayan for products brought in by the Bukidnon will sufficiently illustrate this point:

For one-half picul of gutta percha or hemp, worth approximately ₱12, a jar of salt worth ₱0.20.

For 3 pounds of hemp worth about ₱0.55, two boxes of matches costing ₱0.02 each.

For two bid-bids of hemp or gutta purcha, worth approximately ₱1.10, a package of cigarettes worth ₱0.06.

For one bid-bid of hemp, 1 Highland cream can full of kerosene oil.

SOUTHERN INSPECTION TRIP.

Immediately after the passage of the act providing for the organization of Agusan, the undersigned left on his annual southern inspection trip.

MINDORO.

The first province visited was Mindoro, where good crops and a continuance of good order had produced substantial improvement in material conditions since the time of the last inspection.

CHOLERA IN MASBATE.

A brief stop was made at Mandaon, in western Masbate, where cholera had appeared. The municipal government was found to be paralyzed. The barrios had established an unauthorized quarantine against the center of the town, and the municipal council had held no meeting since the outbreak of the disease. The district health officer, who was on the ground, had been unable to obtain sufficient help to bury the dead. A good supply of disinfectants was left, and a strong effort was made to bring the municipal authorities to an appreciation of their duties.

SAMAR VISITED.

Three short stops were made on the island of Samar, in order to secure information needed for completing the draft of an act for the establishment of a special government for the hill people of that island.

LAND CASES IN SIQUIJOR.

The island of Siquijor was visited in order to decide a group of land cases, the bureau of forestry having certified that the land in question was public forest land more valuable for forest than for agricultural purposes, and the claimants to it having stated in writing that it was not forest land at all, but had been under cultivation up to the time of the revolution, when they were forced to abandon it and that bushes had since grown up on it. They maintained that old division lines had been marked and were still plainly visible. As repeated requests for further information resulted only in the repetition of these flatly contradictory statements, the undersigned inspected the land personally, finding that it was virgin forest land. The ignorant petitioners had been misled by an educated sharper, who had promised to secure the land for them on the payment of sums ranging from 10 to 50 pesos each. They did not know the contents of the documents which they had signed. This case is typical of many.

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MISAMIS AND BUKIDNON.

The capital of Misamis was next visited, and after a brief conference with the provincial authorities, the undersigned, in company with Lientenant-Governor Lewis of Bukidnon, set out on a rapid seven days' horseback trip through that subprovince, visiting the settlements of Tanculan, Maluco, Impusungong, Culungsangay, Malabalay, Linabo, Impalutao, Sumilao, Lipayan, Puntian, Camotian, and Nanca, in order more thoroughly to familiarize himself with conditions among the Bukidnon people. After careful consideration the rancheria of Malabalay was fixed upon as the most desirable site for a capital, it being the best-kept settlement of the subprovince and having the additional advantage of being centrally situated.

SURIGAO AND BUTUAN.

Immediately after returning to Cagayan de Misamis our party sailed for Butuan, at the mouth of the Agusan River, in order to get under way preparations for a trip up the Agusan River, and while transportation was being prepared Surigao was visited. After a conference with the authorities of that province we returned to Butuan and, in company with Mr. Frederick Johnson, the newly appointed governor of the province of Agusan, ascended the Agusan and Sumilao rivers for a distance of approximately 160 miles, visiting the municipality of Talacogon and the Manobo settlements of San Vicente, Amparo, Las Nieves, Esperanza, San Islao, Guadalupe, Santa Inez, San Luis, Martires, Clavijo, and San Jose.

GENERAL CONDITIONS IN AGUSAN.

Both in Bukidnon and in Butuan the change in the form of government was explained to the people, and the purpose of the new provincial government to protect them in their rights was made plain to them.

In both subprovinces improvement in conditions should be rapid. Although there are some warlike Manobos in the mountains which form the boundary between Bukidnon and Butuan, and although Moros in the vicinity of Lake Lanao sometimes penetrate into the former subprovince, most of the people of Agusan are peaceful, industrious agriculturists. The Bukidnon produced most of the coffee and cacao, and all of the hemp of Misamis. They are now getting out a considerable amount of gutta-percha. Their country has enormous stretches of level plain suitable for cattle raising on a large scale. It is abundantly watered. The larger streams have cut deeply into the plain, and it is in the ravines or canyons there formed that most of the cacao and hemp are grown. The plain has an elevation of from 950 to 2,750 feet. It has a cool and healthful climate and is capable of supporting a very large population.

In the valley of the Agusan River conditions are very different. There are enormous stretches of level land on both sides of the stream. As a rule, the land in the immediate vicinity of its banks is high, but in many instances it slopes back into swamps. The whole valley is heavily forested and contains much merchantable timber. Conditions are ideal for the growing of abacá (hemp), rubber, and cacao, and coffee would also doubtless flourish.

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The river is deep and very free from dangers and with its many branches affords an excellent waterway. Drought seems to be practically unknown in its valley. During our visit, in the height of the dry season, the soil was damp, showers were not infrequent, and heavy river fogs were of nightly occurrence. In spite of the dampness the health of the natives seemed to be considerably above the average.

One of the first measures taken to improve conditions in Agusan should be the construction of a trail between Butuan and Bukidnon. Communication can be had at present only by sea.

WORK ON FISH AND FISHERIES PROVIDED FOR.

In the last annual report of this department attention was called to the need of a systematic investigation of the great undeveloped marine resources of the Philippines. During the year arrangements have been made for beginning such investigation. While the undersigned was in Washington a tentative agreement was entered into relative to securing the services of the United States Fish Commission vessel *Albatross* in Philippine waters for a period of eighteen months. This agreement was later made final, and the *Albatross* should be here and at work early in November, 1907. Meanwhile, the bureau of science has secured the services of Mr. Alvin Seale, who has had ten years' experience in tropical countries, and who is thoroughly familiar with pearl-fishing methods and with the methods employed by the Japanese artifically to provoke the production of pearls.

INTRODUCTION OF BLACK BASS.

Mr. Seale arrived in the Philippinês in April, bringing with him a large number of salmon trout eggs and 200 black bass, with a view to the possible introduction of these valuable food fishes into the mountain streams of northern Luzon.

The trout eggs came through in good condition, but unfortunately they reached Benguet, where the hatching experiments were to be made, during the hottest month of the year, when the mean temperature of the water was about 70° Fahrenheit. As a result they hatched very rapidly and the small fry died.

The opinion was freely expressed among experts that it would be impossible to bring young bass alive for so great a distance. Mr. Seale arrived with all but 23 of his bass in vigorous condition, the death of the remainder being due to the accidental leakage of salt water into one of his cans during deck-washing operations. Part of the bass were planted in a small artificial pond at Baguio, and the remainder were placed in a large natural pond in the Trinidad valley and in the Trinidad River. Up to date they are thriving and growing rapidly and the experiment seems to have been a complete success. As soon as they have reached breeding age, the young will be introduced into other ponds and streams.

WORK OF MR. SEALE.

Since his arrival Mr. Seale has spent much of his time with the native fishermen, in order to familiarize himself with the methods used by them and to be able to suggest improvements therein. He has found that the fishes locally known as "bangus," which are brought in large quantities from Mindoro and elsewhere to the provinces of

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Cavite, Rizal, and Bulacan, and are raised for market in artificial ponds, may be taken in great numbers at various hitherto unknown points in the archipelago, and that rearing ponds can be readily and inexpensively constructed in many of these regions.

In accordance with his suggestions, an ordinance, calculated to save from destruction the valuable fresh water fisheries on the Butas River in Mindoro, has been adopted by the township of Naujan.

Since his arrival he has obtained no less than 3,181 specimens of fish, which include 631 species, many of which were previously unknown outside of the Philippines, while some 35 are new to science.

POISONOUS FISHES.

The question of fish poisoning has been one of much interest. The number of persons who die annually from this cause is considerable, and as its symptoms closely resemble those of Asiatic cholera, needless anxiety is often occasioned. Mr. Seale cooperated with the bureau of health in an investigation as to the occurrence of poisonous fishes in the Manila markets and six species were discovered which were so actively poisonous that if eaten they cause vomiting, diarrhea, muscular weakness, profound prostration, coma, and death, unless the cases are actively treated.

The bureau of health immediately prohibited the sale of these poisonous species, since which time the number of cases of sickness resembling cholera at Manila has greatly diminished.

BUREAU OF HEALTH.

GENERAL RESULTS.

The results of the work of this bureau during the year have been more satisfactory than those obtained in any previous year since the American occupation. The death rate for the city of Manila was 36.9 to the thousand as against 40.99 for the previous year, while the death rate for Americans was but 5.59 to the thousand, a reduction of 3.75 over the previous year; among Spaniards it dropped from 17.40 to 15.84.

There was not a case of bubonic plague in the islands. More than 2,000,000 vaccinations against smallpox were performed and the effectiveness of the systematic campaign which has been conducted against this disease was clearly demonstrated. Not a single death from it occurred in the city of Manila, and in the provinces of Cavite, Batangas, Cebu, Rizal, Bataan, La Laguna, and La Union, where heretofore there have been approximately 6,000 deaths per year, not one was reported. In the few places in other provinces where smallpox appeared it made little headway.

It is especially gratifying to note the result of the campaign against leprosy; the number of known lepers in the archipelago on September 1, 1905, was 3,580; on June 30, 1907, it was 2,826, a decrease of 654 due directly to the removal from a number of islands of all lepers, and the isolation of the latter at Culion. In the territory thus freed from the disease hardly a new case occurred, and the mortality among lepers being always high the prevention of the spread of contagion has materially reduced the total number of sufferers from this dread disease.

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NEW CENSUS OF MANILA.

During January the bureau of health took a census of Manila which showed the population to be 223,542, as against 219,941 given by the official census in 1903. There has been an increase of 18 per cent in the number of Americans, 2 per cent in the number of Filipinos, 14 per cent in the number of Spaniards, and 27 per cent in other nationalities.

The Chinese population has decreased 15 per cent. The figures of this census will hereafter be used in compiling vital statistics but are doubtless materially too low. It was taken at a time when a large number of laborers were absent in the provinces and it is believed that as a result of the suspicion with which the more ignorant class regard all attempts to enumerate them a considerable additional number successfully sought to evade being counted.

CHOLERA.

At the time of the last annual report the bureau of health was busily engaged in combating an epidemic of cholera which was finally brought to an end on November 27, 1906. There were a few cases scattered throughout the year in Capiz and in northern Samar, many of which were never confirmed by a microscopic examination. In the city of Manila there were during the year 848 cases with 744 deaths; in the provinces 7,085 cases with 5,243 deaths. The disease spread slowly by land both north and south. At one time conditions became very threatening in Tayabas, but the epidemic was finally checked in that province when it reached the narrow neck of land between Laguimanoc and Atimonan.

An effective marine quarantine was maintained, and at no time did cholera spread by sea. These results were accomplished with practically no additional expense above that ordinarily incurred in routine health operations.

On July 2, 1906, cholera reappeared at Pasig, and later at Iloilo, on September 18, after the island of Luzon had been free from it for a period of twenty-four days.

BUBONIC PLAGUE.

Since 1903 the bureau of health has been striving to eradicate plague through the isolation of all persons suffering from the disease and the destruction of plague-infected rats.

This policy has resulted in the steady diminution and ultimate disappearance of plague throughout the islands. The following are the figures for Manila: 1903, 160 cases; 1904, 94 cases; 1905, 41 cases; 1906, 20 cases; 1907, no cases. There was not a case anywhere in the archipelago outside of Bilibid Prison, and those which occurred there were the immediate result of prophylactic inoculations against cholera made by Dr. Richard P. Strong with a culture that had previously been contaminated with plague organisms by some unknown person under conditions which strongly suggest criminal intent. Twenty-four developed plague as a result of this inoculation and of these 14 died. A rigid examination was made into this

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lamentable occurrence by a technical and a general committee appointed by the governor-general, and the reports of these committees were submitted to the attorney-general for a determination as to whether any responsibility for this occurrence rested on Doctor Strong. Doctor Strong was completely exonerated, it being shown that the serum used by him had been prepared with the greatest care, that he had exercised all due precautions in its preparation and use, and that he was not in the slightest degree responsible for the results of the act of the unknown person above referred to. Although the disease was thus brought into a crowded institution with some 3,500 inmates, it was confined strictly to the persons inoculated with the contaminated culture and a conclusive demonstration of what can be accomplished by modern sanitary science in preventing the spread of plague even under adverse conditions was thus furnished.

BERI-BERI.

There were 403 deaths from beri-beri in Manila as against 378 for the previous year. One death occurred to every 391 Chinese, and one to every 450 Filipinos; there were no deaths from this disease among Americans or Europeans.

In public institutions for the confinement of human beings the decrease in the number of deaths from beri-beri was noteworthy. Less and less difficulty is being encountered in preventing the spread of this disease in jails and other institutions where the inmates are under the direct control of the bureau of health.

TUBERCULOSIS.

Tuberculosis continues to be the most important cause of death among adults in the Philippine Islands. One-sixth of the total deaths in Manila during the year were from this cause. Fairly successful methods for preventing the spread of the disease are well known, but they are excedingly difficult of enforcement under the conditions which exist in these islands. Improvement can come only through education of the masses, and this will necessarily be a slow process. The bureau of health has issued a bulletin dealing with the subject of tuberculosis in a practical manner, and the facts there set forth are being taught to the children in the public schools.

DIPHTHERIA.

The existence of true diphtheria in the islands has heretofore been a matter of some doubt, but during the year there were reported in the archipelago 10 cases with 8 deaths; the 2 cases which recovered were treated with antidiphtheretic serum manufactured by the bureau of science. This serum was not used in the cases which resulted fatally.

TYPHOID FEVER.

There was a decided increase in the number of cases of supposed typhoid fever in Manila, 58 persons dying, as against 45 for the previous year; in less than one-fifth of the alleged cases were the diagnoses verified by laboratory methods.

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MALARIA.

From malaria in Manila, 173 deaths were reported, the number being 23 less than for the previous year. In a great majority of the cases the diagnosis was not confirmed microscopically, and it is very doubtful if there really were even this limited number of cases. In the provinces also, there was a marked falling off in deaths from malaria, doubtless due in a large measure to the free distribution by the bureau of health of quantities of quinine in regions where the disease had been most prevalent.

INSANITY.

Conditions as to the prevalence of insanity in the Philippines are very satisfactory; 1 person in every 1,667 is reported insane, as against 1 to every 466 in the United States and 1 to every 304 in Great Britain. The percentage of recoveries among persons admitted to the San Lazaro Insane Asylum has been 19. Of the 3,449 insane persons known to exist in the islands, less than 300 have been cared for in the asylum. Fifty-five thousand pesos have been appropriated for erecting and equipping at San Lazaro a new insane ward with space for 250 additional insane. At the time of writing this report this building is ready to be occupied, so that some additional relief is at hand.

AMŒBIC DYSENTERY.

The number of deaths reported in the city of Manila was 344, as against 288 for the previous year. Doubtless this apparent increase has largely, if not entirely, been due to the fact that the disease is now diagnosed with much greater certainty than heretofore. A bulletin on this disease and methods of preventing it has been prepared by the bureau of health for use in the public schools.

DECREASE OF LEPROSY.

Attention has already been called to the encouraging results that have come from the removal of all lepers from a part of the territory of the Philippine Islands. So far as known, there are now none remaining in Simara, Tablas, Sibuyan, Romblon, Mindoro, Negros, Palawan, Cuyo, Samar, Leyte, or Marinduque; fully one-quarter of the territory of the Philippine Islands has thus been freed from leprosy. Comparatively few lepers, in the Philippine Islands at least, die of that disease, but their weakened physical condition results in their falling ready victims to numerous other diseases, and the resulting mortality among them is very high. Experience during the past year serves only to strengthen the belief that if we can prevent the occurrence of new cases through infection, we may rid the islands of this horrible plague in the near future. It was deemed best to carry on the experiment of isolation at Culion somewhat slowly at the outset, in order that wisdom might be gained by experience; the experience has been such that the insular government has now definitely adopted a policy looking to the isolation at Culion of all lepers

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in the islands during this and the coming fiscal years. Approximately one-half of the sum necessary to carry out this great work has been appropriated. Much less opposition to the removal of lepers has been encountered than was anticipated. This has, in part, been due to the favorable reports sent out by inmates of the Culion colony as to conditions there; in part, to the fact that microscopic examinations have shown that many persons believed by their friends and relatives to be lepers were suffering from curable diseases and through proper treatment have been restored to society; and, in part, to the fact that the Filipino people themselves, finally recognized the constantly growing menace of leprosy and the necessity for the adoption of radical measures if it was to be successfully combated.

TREATMENT OF LEPROSY BY X-RAYS.

After many vexatious delays the worn-out X-ray apparatus at the San Lazaro Hospital was replaced by a new one, and patients were placed under treatment as follows: November 2, 4; November 3, 3; November 4, 4; November 5, 1; November 6, 6; November 7, 10; and April 30, 1907, 1; total cases 29. In the treatment a regular Gundlach tube was used; exposures were ten minutes in length, at a distance of from 5 to 10 inches, with light enough to give a distinct outline of the bones of the hand and wrist. Treatments were given at first once every three days and later, every second day, the eyes of the patients being protected by suitable shields. Very marked improvement occurred in 8 cases, and considerable improvement in 13; in 7 there was no change, and 1 case died from lobar pneumonia, his death apparently not being in any way connected with the X-ray treatment. Of the 7 cases which show no change, all are in as good health as when treatment began; in several of them the progress of the disease seems to have been arrested. The general health of the 13 persons showing improvement is as good as, or better than, at the time when treatment began. Clinically, the improvement consists in a reduction of the size of the ears and nose, and the disappearance of numerous leprous nodules. With the 8 persons who show marked improvement hypertrophy and infiltrations have almost entirely disappeared and the only evidences of the disease remaining are scars from previous ulcerations, except that several of these persons still have partial contraction of the fingers.

In summarizing these results, the director of health says:

> From the foregoing it may be seen that so far at least the X-ray has not proved a specific for the cure of leprosy, yet better results have been obtained than with any other treatment that has heretofore been used, and even if the percentage of recoveries should be no larger than in the past, it would at least offer some hope to individuals afflicted with this disease.

OTHER METHODS OF TREATMENT OF LEPROSY.

Various other more or less widely recommended methods of treating leprosy have been tried, including the use of chaulmooga oil with strychnine. During February the bureau secured a number of bottles of Leprol through the kindness of Dr. Kannosuke Nuyajima, delegate of the Japanese Government to the meeting of the Philippine Islands

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Medical Association. Leprol is an oil now being experimented with in Japan; it has been persistently used on two cases at San Lazaro Hospitals, and clinically they are greatly improved, but they still have the bacilli of leprosy in their tissues. The results obtained with Leprol are better than those secured through any other treatment except the X-ray.

VACCINATION AGAINST SMALLPOX.

During the year there were 2,022,380 persons vaccinated by the bureau, an increase of 1,073,255 over the previous year; some 50,000 additional persons were protected by vaccination used by local officials at places where smallpox appeared. Attention has already been called to the fact that in the provinces of Cavite, Batangas, Cebu, Bataan, La Union, Rizal, and La Laguna there were heretofore reported annually some 6,000 deaths and that since the completion of vaccination in these provinces, somewhat more than a year ago, not one death from smallpox has been reported. Is any further argument needed as to the efficiency of vaccination? At the present rate of progress the Philippine Islands will soon be entirely freed from this scourge. The greatest difficulty encountered is that of satisfactorily preserving vaccine matter until it can be used in the more inaccessible parts of the archipelago. The fact that there has been no loss of life nor of any limb, and that there has been no serious case of infection resulting from the vaccination of more than 2,000,000 human beings is sufficient proof as to the care with which the vaccine has been prepared by the bureau of science and used by the bureau of health.

PURE FOOD AND DRUGS.

There has long been a crying need for legislation which would assure the people of these islands more wholesome food and pure drugs. On June 30, 1906, the Congress of the United States passed an act which was designed to secure this result for the people of the United States as well as for the inhabitants of its insular possessions. On November 9, 1906, the governor-general called attention to this act in a proclamation and named certain officials to enforce its provisions, but later, on the recommendation of the attorney-general, who held that the legal machinery provided by the act of Congress was not adequate for its enforcement in the Philippine Islands, a new act, embodying all the provisions of the act of Congress applicable to the Philippines and making only the necessary changes and additions to facilitate its enforcement was passed by the Commission. Active steps for its enforcement could not be taken at the outset, as it was first necessary to secure additional chemists from the United States; such steps will, however, be taken in the immediate future; they are rendered the more necessary by the fact that venders of certain well-known patent medicines who have been driven out of business or compelled to change the formulæ for their remedies in the United States, are now advertising extensively in these Islands, and the more ignorant inhabitants are likely to fall ready victims to their unscrupulous methods and poisonous concoctions.

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DEATH RATE AT BILIBID PRISON.

One of the most gratifying results which has attended the work of the bureau of health since its organization has been the reduction of the death rate in Bilibid prison. Up to September, 1907, the prison maintained its own medical staff. Failure to eradicate cholera led to the temporary turning over of the sanitary management of the prison to the bureau of health, and the immediate success obtained in dealing with cholera led to the permanent transfer of the entire work of sanitation and care of the sick in Bilibid to that bureau. At the time this transfer was made, in September, 1905, deaths were occurring at the annual rate of 238 to the thousand; there has been a fairly steady decrease up to the end of the fiscal year, at which time the rate was 13.5 to the thousand. An important factor in this result has been the decrease in crowding, owing to the establishment of the Iwahig penal settlement and the use of prisoners upon public works in the provinces.

PURE-MILK CAMPAIGN.

An active campaign has been inaugurated by the bureau of health for securing better milk for the people of Manila; of 213 samples taken by its agents and examined at the bureau of science, only 131 were found fairly good. Small dealers in many instances frankly admitted that they added water, cocoanut oil, rice flour, sugar, or other substances in order to cheapen the price at which they could sell their milk. They were greatly surprised that any objection should be made to this practice. The city ordinance dealing with this subject is adequate, but on account of the ignorance of many of the vendors it was deemed best first to undertake a campaign of education by having sanitary inspectors explain the law to all of them; this has now been done and hereafter it will be enforced as rigidly as practicable.

THE "PROTECCION DE LA INFANCIA."

While the bureau of health has been waging a campaign against bad milk an organization known as the "Women's Association of Manila" has come to the aid of the bureau and the public by establishing an institution known as the "Proteccion de la Infancia," the object of which is to furnish pure sterilized milk to infants whose mothers are not able to nurse them. This institution occupies quarters which are conveniently near the more populous and poorer districts of the city. It is provided with every modern facility for the proper preparation of milk and competent persons are in charge of the work.

The infants to whom milk is furnished are divided into three classes, namely: those of the very poor, those of the middle class, and those of the rich. To the first of these milk is furnished at 5 centavos per day; to the second, at 30 centavos, and to the third at 80 centavos.

A particularly encouraging feature of this work is that it has been inaugurated and is being carried on by the Filipinos. It deserves and will receive every encouragement and all assistance which the bureau of health, the bureau of science, and the bureau of agriculture can give it. Should it meet with the reception which it

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deserves at the hands of the public and receive the financial support to which its importance entitles it, a very material reduction in the present shockingly high infant mortality of Manila should result.

SANITARY SUPERVISION OF RELIGIOUS PILGRIMAGES.

The roads followed by pilgrims in oriental countries have long been recognized as higways for the transmission of disease. Although gatherings of religious devotees do not occur in the Philippines on such a grand scale as in some other parts of the Orient, they nevertheless take place annually at several points in the archipelago. The largest is that at Antipolo, in the province of Rizal, during the month of May, when this little place, which normally has a population of some 2,800, is often called upon to entertain 10,000 or more visitors in a day. It is estimated that during April, May, and June 250,000 persons visit Antipolo and worship at the shrine of Nuestra Señora de la Paz y Buen Viaje. A small village is thus suddenly converted into a large town, which lacks necessary sanitary facilities and sometimes even necessary food. Each year it is necessary to install an emergency closet system and to send a guard of soldiers to prevent the pollution of the drinking water, while careful attention is given to the regulation of the sale of food and drink. During the present year both typhoid fever and dysentery appeared among the visiting thousands, but neither disease spread to any extent.

TREATMENT OF OPIUM PATIENTS.

The opium act provides that a part of the revenue derived from the taxation imposed by it shall be available to pay for the care of victims of the opium habit who may desire to be cured. At the time the law took effect the bureau of internal revenue sent its agents to talk to people known to be addicted to the use of the drug, and informed the director of health that the number of persons desiring treatment would reach into the hundreds. Contracts were accordingly entered into with the San Juan de Dios Hospital at Manila and the Mission Hospital at Iloilo to take care of all applicants. The total number of applicants has been 10. It is to be feared that this indicates that the victims of the habit continue to get the drug without great difficulty.

SANITATION AT THE IWAHIG PENAL COLONY.

Some time after the establishment of the Iwahig penal colony, the officers and convicts sent there began to suffer severely from malaria. Upon the transfer of the control of the sanitation of the settlement to the bureau of health, all persons who were not under the direct control of the superintendent were excluded from the reservation. Each convict was made to swallow daily a prophylactic dose of quinine and to sleep under a mosquito net. All marshy and damp places near the colony were drained, and in a few months the disease practically disappeared. In a short time the average number of sick in hospital dropped from 80 to 15. The death rate per thousand in 1905 was 261; in 1906 it was 118; during the first six months of 1907 it was 25.

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A NEW SANITARY CODE FOR MANILA.

During the year an adequate sanitary code for the city of Manila has been enacted. It was highly important that the somewhat miscellaneous aggregation of military orders and city ordinances which had accumulated should be compiled and embodied in a carefully arranged code, so that the citizen might fully understand his duties and the powers of officials might be clearly defined. The new code has been prepared with great care, and its provisions and the necessity therefor are fully described in the annual report of the director of health (Appendix A).

NEW HOSPITAL CONSTRUCTION.

The provision of more adequate hospital facilities at Baguio and in Bilibid prison at Manila, the enlargement of the San Lazaro insane hospital, and the erection of adequate buildings for a general hospital at Manila have long been imperative necessities, and have often been referred to in previous reports of this department. By supplementary appropriation bills during the past year, and by the regular appropriation bill for the fiscal year 1908, these necessities have now been met, the following sums having been made available for the purposes named:

For a general hospital at Manila	₱780,000
For a new hospital at Bilibid prison	100,000
For an addition to the insane hospital at San Lazaro	55,000
For construction of a new hospital at Baguio	50,000

The construction of a new hospital at Baguio is particularly opportune at this time when improved transportation facilities will make it possible for a large number of persons to get the benefit of the invigorating Benguet climate while recovering from wasting diseases or recuperating from severe surgical operations.

The new general hospital for Manila will be situated on the exposition grounds in close proximity to the present building of the bureau of science and the new building of the Philippine Medical School which is to be immediately constructed, giving an ideal arrangement. It will be built on the pavilion plan, and will have an administration building, surgical pavilion, nurses' home, 5 wards of 60 beds each, detached ambulance stables, free dispensary, kitchen, and other outbuildings. The original capacity of 300 beds can be increased at any desired time by the construction of additional wards.

A new insane ward at San Lazaro is already completed and in use. It is a substantial fireproof structure of reenforced concrete and proves admirably adapted to the purpose for which it was erected. Its finishings are attractive and it commands a view of a busy street which also serves to attract and hold the interest of patients. It offers very abundant space for 250 insane and could accommodate 350 without serious overcrowding.

IMPROVEMENT OF MUNICIPAL WATER SUPPLIES.

The present water supply of Manila, having more than 10,000 people well within its drainage basin, has been a constant source of anxiety to the health officers, especially during cholera epidemics, and

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at such times elaborate and expensive precautions have been necessary to prevent its infection. The drainage basin of the new water supply for Manila is owned by the municipal government, and is, and will be kept, practically uninhabited. The present indications are that water from this new source will be ready for use within a year.

Much has been accomplished in the improvement of the municipal water supplies in the provinces through the construction of artesian wells. Until very recently all municipalities, almost without exception, drew their water from contaminated springs and streams or from shallow wells. The first experimental artesian wells put down resulted most satisfactorily. Fortunately, too, water from these wells is very popular with the natives, who sometimes come ten or fifteen miles to get it.

REDUCED MORTALITY DUE TO IMPROVED WATER SUPPLIES.

The mortality in some of the towns which are now using artesian water largely or exclusively for drinking purposes has already fallen 20 to the thousand as compared with the corresponding period of last year. The demand for artesian wells on the part of municipalities has greatly exceeded the capacity of the well-boring apparatus owned by the government, and the purchase of additional apparatus has been authorized. Provision has also been made by act 1662 for loans by the insular government to municipalities in order to enable them to construct artesian wells.

INSPECTION OF CEMETERIES.

Under existing law the director of health is required to approve all sites for new cemeteries before they can be used, and to determine whether the continuance of the use of old sites shall be allowed. Somewhat stringent regulations on this subject were made necessary by the fact that formerly cemeteries were often established in the very hearts of towns, sometimes even abutting upon the the public plazas. The amount of ground set aside for the burial of the dead was frequently so limited that the digging of every new grave resulted in bringing to the surface portions of the remains of deceased persons previously interred. The duties imposed upon the director of health in the matter of sanitary inspection have proved very onerous, for the reason that warring religious factions have in many instances tried to use the law relative to cemeteries as a weapon of offense. Numerous entirely unfounded complaints as to the insanitary condition of cemeteries have been made with the obvious intention of causing inconvenience to the persons complained against. All complaints have, however, been patiently investigated. There were 582 cemeteries or proposed cemetery sites inspected during the year, of which 272 were approved and 156 rejected, while decision is pending on the remainder.

NEW SEWER SYSTEM FOR MANILA.

The construction of a new sewer system has been actively begun. More than 14 miles of conduits have been laid and 52 miles of street sewers have been contracted for. The 14 miles already laid include

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the greater portion of the large-sized sewers, so that much greater mileage may be expected during the coming year.

Completion of new water and sewage systems for Manila will greatly reduce the tremendous odds against which the bureau of health has thus far been forced to contend.

DISCOVERY OF CAUSE OF MOSQUITO PLAGUE IN THE WALLED CITY.

The cause of the mosquito plague in the walled city has at last been definitely ascertained to be in the old underground storm water sewers. During the rainy season the current in these sewers is rapid enough to prevent the mosquitos from breeding and the walled city is quite free from them. During the dry season, however, the current becomes very sluggish and at times ceases entirely. The uneven bottoms of these sewers then retain pools of stagnant water, in which innumerable mosquitos breed. Hereafter until the old sewers can be done away with, the fire department will be requested to flush them periodically during the dry season, and the evil can thus at least be held in check.

TRAINING SCHOOL FOR FILIPINO NURSES.

The bureau of health has entered into a cooperative arrangement with the bureau of education for the training of Filipino women as nurses. The Commission has appropriated funds for 10 free scholarships, and several commercial firms have undertaken to meet the expenses of additional scholarships. The course will be largely practical. At present a small hospital ward has been provided which draws its patients from among the inmates of the girls' dormitory at the normal school. The instruction there given will be only preliminary and will be completed in the civil hospital and in the new general hospital. The importance of this work can hardly be exaggerated. There is no reason to doubt that Filipino women will make excellent trained nurses and the need for a greatly increased number of such nurses is very great.

CIVIL HOSPITAL DIVISION.

In spite of the inadequacy of the present quarters, an immense amount of suffering has been relieved at this institution during the year, and the results obtained have been highly satisfactory. Of the 1,310 patients treated, 818 were whites, 463 Filipinos, and 29 Chinese, Japanese, and other Asiatics. Of this number, only 29 died. Three of these were patients of outside physicians. Eight were brought to the hospital in a moribund condition and their deaths may therefore properly be excluded from the number occurring at the institution, the death rate among the patients treated by the hospital staff being less than 1½ per cent.

More than 8,000 prescriptions were filled and nearly 11,000 dressings were made, while about 1,000 minor operations were performed upon outside patients who presented themselves for treatment.

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SANITATION OF BILIBID PRISON.

The satisfactory results obtained during the year in this institution afford conclusive demonstration of the value of both general sanitary measures and detailed laboratory examination. Soon after the bureau of health took charge of this work, a number of structural improvements were made, all drains were deepened and made semicircular in cross section, the level of the ground inside the institution was raised, and a system of daily sprinkling instituted. Drinking-water barrels were provided with locked covers to prevent contamination. Rigid inspections were made of all latrines. Sick persons were encouraged to come to the hospital upon the appearance of their first symptoms. These measures resulted in reducing the average annual mortality to about 75 per thousand, and there it remained. The prisoners were dying from ailments which should not have killed them, and it was evident that their power of resistance was abnormally low. They received plenty of good food, but suffered from improper nourishment. These facts pointed to some extraordinary drain on their systems. Systematic laboratory examination of the feces of every prisoner in the institution was inaugurated and intestinal parasites were found to be present in about 60 per cent of the cases. Active measures were taken to rid the patients of the resulting debilitating troubles, and the average death rate at once fell to about 20 per thousand. It has since gone down to 13.5. One thousand five hundred and thirty-seven cases of ankylostomiasis were treated during the year, as compared with only 39 cases during the previous year. This does not point to any increased prevalence of the disease but merely demonstrates the importance and efficiency of laboratory diagnoses. Unquestionably this disease is of frequent occurrence throughout the islands, and its presence doubtless accounts for a considerable amount of the "laziness" with which Filipino laborers are charged. Systematic measures for its suppression should be taken.

BENGUET SANITARIUM DIVISION.

The erection of two new sawmills, the installation of mining plants, the increase in road work, and the constantly growing number of visitors at Baguio have greatly augmented the medical work at the Benguet Sanitarium. The Igorots are making more and more use of the hospital, and their sick and injured have been brought to it from many miles around. The number of prescriptions filled increased nearly 56 per cent. Eighty cases of malarial fever, all of which had originated at lower altitudes, were treated with results which were uniformly satisfactory and much better than those which have been obtained in the lowlands. The treatment of amœbic dysentery met with continued success.

The inadequacy of the little hospital building, which was originally intended for a small private dwelling house, created well-nigh impossible conditions, and it was necessary to treat many of the sick in private dwellings or at the hotels. The erection of the new building which will have 30 hospital beds and 6 private rooms, containing one to two beds each, will remedy this difficulty. As the impression seems to have gone abroad that the benefits of the hospitals at

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Baguio have thus far been confined largely, if not entirely, to Americans, attention is called to the fact that of the 265 patients treated in the limited quarters available during the last year, 26 were Americans, 2 Europeans, 48 Japanese, and 189 were Filipinos; while the number of outdoor patients, nearly all of whom were Igorots, was 1,371.

The highest temperature recorded at Baguio during the year was 79.5° Fahrenheit, on May 5, and the lowest was 42.4° Fahrenheit, on January 8. The highest mean monthly temperature, 73.62° Fahrenheit, occurred in June. The lowest mean monthly temperature, 48.58° Fahrenheit, occurred in February.

CULION LEPER COLONY.

At the end of the fiscal year there were 739 lepers at Culion. The mortality among them during the year was high, as was to be anticipated from the miserable physical condition of most of them when brought together for removal to the colony. A great majority of them had been public beggars or had existed upon such charity as was voluntarily bestowed upon them. Many were suffering from gangrenous ulcers and from beri-beri. There is no reason to believe that transfer to the colony hastened the death of any of these unfortunates. On the contrary, in many instances life was prolonged or even saved by careful medical attention and good food. Those remaining are healthier, heavier, and generally more robust than when they were received. The deaths by months were as follows:

1906.		1907.	
July	45	January	23
August	48	February	12
September	39	March	13
October	26	April	19
November	36	May	17
December	36	June	23

One case of smallpox occurred, but there was no spread of contagion.

The conduct of the inmates has, on the whole, been excellent, although one crime of violence has occurred. There have been few complaints as to treatment or food, but many of the inmates, especially during the first few weeks after their arrival, have suffered from nostalgia, as was inevitable. All are allowed to roam about the island freely during the day and 18 persons at different times have endeavored to escape. Of these all but 3 have voluntarily returned or have been returned by the authorities.

The most important improvement in the colony has been the establishment of a new gravity water system with a pipe line more than a mile in length, which makes available water enough to meet all present or probable future needs.

SAN LAZARO HOSPITALS DIVISION.

At the San Lazaro hospitals, where smallpox, plague, cholera, and insane patients, as well as lepers, are received and cared for, there were admitted 488 patients during the year, of whom 308 remained on June 30. The cholera and smallpox wards were little used and the plague ward was not used at all.

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In the leper department, there were at the close of the year 129 male and 87 female patients. These will perhaps be the last persons tansferred to the Culion colony, for the reason that while nearly all of the lepers removed to the colony from the provinces find themselves under greatly improved conditions of existence, this could hardly be the case with those at the San Lazaro Hospital, who would doubtless prefer to remain where they are.

The report of the director of health, Appendix A, is appended hereto. It is unusually full and contains an unusually large amount of valuable information which can not here be even reviewed. The highly satisfactory results accomplished have been obtained at an expense of ₱0.06 per inhabitant; and it is only fair to call attention to the fact that they have been brought about in the face of a vicious, determined, long-continued, and wholly unjustified attack upon the director of health and the work of his bureau, carried on by a large section of the local press during nearly the entire period of the absence of the undersigned on leave. The attack, having failed of its object, ended as suddenly as it began.

In closing this statement of the work of the bureau during the year, I feel that I can not do better than to quote the last paragraph of the report of the director of health, who says:

From a sanitary standpoint the year covered by this report has been a successful one, successful not only because it has been practically free from the devastating influence of epidemic diseases but because of the progress that has been made along the lines of real, effective sanitation. The administration has proved sound from a business standpoint. It is believed that the amount spent this year has produced greater results than any similar amount during any year previous. Lives that have been saved if measured in terms of commercial value would reach an enormous amount, but their value to the body politic, especially when such relation is affected by the conditions of an underpopulated country, is beyond human calculation. Heretofore the best efforts of this bureau have necessarily been expended on Manila and municipalities, not far removed, but as the work has become more systematized it has become practicable to extend scientific methods of sanitation to some of the more remote districts. The importance of the work becomes apparent when comparisons are made with near-by Oriental countries. The conditions for the spread of plague are as favorable in the Philippine Islands as they are in many parts of India where it is raging with great severity. The inhabitants of the Philippines are no more immune to cholera than are the inhabitants of Bengal. Why is it that the country is not decimated by devastating epidemics of smallpox as are certain parts of China? The only available explanation, so far as this office knows, is that eternal vigilance, which is the price of success, has been observed.

The newspapers are not yet through praising the results gained by the sanitary methods adopted by the American Government in Habana during the early part of the American-Spanish war. These measures were indeed successful and the results deserve all the compliments they have received, but it should not be forgotten that they were brought about under very favorable auspices; that the country was under military rule and the orders of the health officer were supported by the prestige of martial law. The Cuban politicians and the opposing press were for the time, silent; sanitation was the order of the day and no excuses were taken, there were no lawyers to contest in court; no restraining orders and no legal obstacles. Large sums of money for sanitary purposes were appropriated in Cuba while in the Philippine Islands only small amounts were available for sanitation. The results here have been brought about on different lines; every effort that has made for progress has been obstructed by meddlesome opposition; and every advance has been sharply contested. Perhaps in the long run it will all be for the best, and the results may be of a more permanent character than if they had been gained with less effort. It has been a campaign of education, patience and persistence.

Reference to the statistical tables in each succeeding annual report will show a steady decrease in the dangerous communicable diseases since American occu-

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pation. While they show the success that has been achieved, they do not record the hard work, the discouragements, the faithfulness and efficiency of those to whom the credit is due—the employees of this Bureau—therefore it remains for the Director of Health publicly to acknowledge their part in bringing about what he believes to be a successful issue.

In this acknowledgment the undersigned desires to join.

BUREAU OF QUARANTINE SERVICE.

The quarantine service has been effectively maintained, with the result that no quarantinable disease is known to have been permitted to enter the Philippines, and the spread of cholera by sea has been entirely prevented.

Increased experience seems to show conclusively that in these islands after cholera has once established itself the incubation period of the disease is practically never more than forty-eight hours. The outgoing quarantine detention period was therefore reduced to two days. This has greatly lessened the losses and annoyances necessarily incident to quarantine, without jeopardizing the safety of the islands.

VESSELS DISINFECTED.

Eighty-five vessels were disinfected during the year, with the usual entirely satisfactory result. It is gratifying to note that there is a steady annual decrease in the number of vessels found to be infected with quarantinable diseases. In 1905 there were 28 such vessels; in 1906, 23; and in 1907, 14. This reduction is no doubt due, in large measure, to the systematic vaccination of the crews of all local vessels, which has been continued. The number of cases of sickness from nonquarantinable diseases has also largely diminished, as a result of the constant fight which has been maintained against insanitary conditions in the living quarters of the crews of vessels. When inspection was first introduced skin diseases were found in almost every occupant of the forecastle, and beri-beri was discovered on many vessels. Now, both skin diseases and beri-beri have almost disappeared among the crews.

Owing to the absence of any special health emergency during the year, other than the cholera epidemic, the work of the bureau of quarantine service has been routine work, and any full report of it necessarily takes the form of tables of statistics. Such full report has been made by the chief quarantine officer, and is appended hereto as Appendix B. The undersigned can hardly state the facts more concisely than they have been stated in this report, to which those interested in the further details of this work are referred.

BUREAU OF FORESTRY.

The work of this bureau has progressed satisfactorily, an important factor in the success obtained being the increased familiarity of the foresters with their districts. With two exceptions, each of the foresters has now completed at least two years of service in the district under his charge.

FORESTERS' CONFERENCE.

The custom inaugurated a year since of holding an annual conference of the foresters of the bureau, near the close of the fiscal year,

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has been continued with beneficial results. The discussion of important forest problems by men who have worked in different parts of the archipelago, under widely varying conditions, is sure to be helpful. Representatives of the bureau of internal revenue, bureau of lands, bureau of science, bureau of agriculture, and of the Manila lumbermen were present when matters of especial interest to them were under discussion, and thus the practical experience of men in other bureaus, and in private life, was brought to bear on forest problems.

One of the results of this conference was a change in the organization of the bureau of forestry, the division of forest investigation being established in lieu of the division of forest products, and a new division, known as the "division of forest administration," being organized. The division of forest administration, with a force of 6 foresters and some 18 rangers, will take charge of the work pertaining to licenses, violations of the forest act, etc., and will do as much special investigating as possible, in cooperation with the division of forest investigation, which will confine itself to this latter line of work, making special studies and preparing special maps of various parts of the islands.

ABUSE OF FREE TIMBER PRIVILEGE.

It is the concensus of opinion, both of the entire force of the bureau of forestry, and of all other intelligent persons familiar with the facts with whom the undersigned has conferred, that the privilege of free use of timber, granted October 19, 1905, for the period of five years, has been greatly abused; that one of its consequences is to render difficult, if not impossible, the proper safeguarding of the forests by the bureau of forestry, and that steps should be taken to check the abuses which exist. The question is a puzzling one. There is no desire to curtail the privileges of those who wish to secure from the public forests a reasonable amount of timber for private use. But it is not easy to see just how the use of the forests is to be confined within the limits fixed by law, without the enforcement of regulations which will greatly incommode private persons in securing the timber to which they are legitimately entitled.

Relative to this matter, a committee of foresters, directed to report upon the free-use privileges at present confirmed by law, makes the following statement:

It is the opinion of this committee that every home builder in the Philippine Islands should have a similar privilege to that granted settlers in the vicinity of national forests in the United States. There each settler is allowed an amount of timber each year not to exceed a fixed amount, sufficient for his needs, to be used by him in house building, repairs, fencing, etc. To obtain this timber he must apply to local forest officers and remove the material desired from such places, and in such a manner as not to injure the public forests.

A similar right has been granted the Filipino people, but without the restrictions necessary to insure the safeguarding of public interests. The Filipinos may enter any public forest and cut such timber as they desire, without restriction as to amount or sizes. Twelve of the more valuable woods, comprising what is known as the first group, are protected by the present law, but these, as a group, furnish less than one-sixth of the total cut of the islands, and the greater part of this one-sixth is from three to four species, cut in the more inaccessible and thinly inhabited regions. In the thickly populated districts these twelve timbers have almost disappeared, and the bulk of the cut comes from lower group trees. It is from these species of the lower groups that the

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future supplies of the islands must be drawn. They are of more importance to the agricultural and commercial development of the islands than the first group timbers.

Rapid economic development depends on cheap construction timbers, and not on fancy woods, or expensive woods suited to special uses. Timber that will furnish the necessary construction timbers for Philippine industrial development is found in the existing forests, but is being rapidly destroyed by the present unrestricted cutting.

We are required to-day carefully to inspect and regulate the cutting of 1,000 timber licensees, whose work is, in the main, satisfactory, and is not materially injuring the forests, and we are forbidden to interfere with the cutting of a population of 7,000,000, of whom one and one-half millions are grown males. These men may enter the forests and cut and waste at will the principal timber resources of the islands.

The bureau of forestry was called into existence to perpetuate the forests by wise use. To give to the people of these islands timber and fuel supplies for all time, and to safeguard its agriculture by caring for watershed forests. Under the present law, the hands of the bureau are tied, and the policy as embodied in this law, allowing the free and unrestricted use of timber, if persisted in, means the ultimate waste and destruction of the islands' timber resources, and a checking of its future economic development.

In view of the shortcomings of the present law, its amendment is sugegsted. This amendment should contain such part of the following rough draft as, in the opinion of the Philippine Commission, may best protect the public interests and aid in home building:

"AN ACT Amending subsections (*b*) and (*c*) of section nine of act Numbered Fourteen hundred and seven, so as to permit the free use of forest products, and providing for the regulation thereof.

"*By authority of the United States, be it enacted by the Philippine Commission, That:*

"SECTION 1. Subsections (*b*) and (*c*) of section nine of act 1407 be, and the same are hereby amended so as to read as follows:

"SEC. 9 (*b*). Every resident living in or near the public forests, and who is in need of building material, fuel, fencing, or other forest products, stone, or earth, for the personal use of himself, or his family, may, without written permit, enter such public forest as the director of forestry, with the approval of the secertary of the interior, shall designate, and may remove, free of charge, an amount of timber not to exceed fifteen cubic meters in any fiscal year, and such amount of other products as is actually necessary for his personal use. The director of forestry, with the approval of the secretary of the interior, shall prescribe species, sizes, and manner of removal of forest products, stone, or earth, and may, if the public interests demand it, withhold from any individual the right, under this act, to the free use of timber in the public forests.

"(*c*) The director of forestry, with the approval of the secretary of the interior, may from time to time, set aside certain tracts of public land which shall be known as communal forests, and be assigned to certain communities, whose free use privilege shall be confined solely to these areas, subject to the limitations prescribed in subsection (*b*). These forests shall be on lands more suitable for forestry than for agriculture, and shall be administered by the director of forestry, with the approval of the secretary of the interior, under such rules and regulations as he may deem wise. The object of the administration of these communal forests shall be to furnish the people having rights therein with the forest products necessary for their home use, and to preserve their water supply. Exploitation of said communal forests for revenue shall be allowed only when the best interests of the forest demand a cutting in excess of local needs. Such exploitation for revenue shall be under license as in other public forests, and forest charges shall be collected in the usual manner and covered into the treasury of the Philippine Islands. These revenues to be returned to the community having rights in the given forest and be devoted, under the direction of the secretary of the interior, acting with the advice of the superintendent of public instruction, to the public education of the community and the improvement and preservation of its forests.

"SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of 'An act prescribing the order of procedure by the Commission in the enactment of laws,' passed September twenty-sixth, nineteen hundred.

"SEC. 3. This act shall take effect on its passage."

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RECOMMENDATIONS OF FORESTERS' CONFERENCE.

The recommendations of the foresters' conference, embodying as they do the results of several years' practical experience, are worthy of careful attention. In so far as they concern administrative matters within the control of the bureau, they may be taken as indicating its policy during the coming year. They are as follows:

1. That the map work be pushed during the coming year in view of its importance at this time. The principal mapping will be the land classification or plot maps. In addition, a beginning will be made in establishing boundaries for possible future reserves. Detailed surveys to be made of a few important cutting areas.
2. That every possible effort be made to assist Doctor Foxworthy, of the bureau of science, by means of data and wood specimens in making a definite key for the determination of Philippine woods.
3. That collections of botanical, wood, and other museum specimens be continued, but made with the least possible expense. That seeds of the important trees be collected, to be used in nursery experimentation work on the Lanao Forest Reserve by Mr. Cuzner, of the bureau of agriculture.
4. That identified railroad ties of the following species be secured and placed in the track, in cooperation with the Philippine Railway Company, in order to secure definite information regarding their durability and fitness for this use: Toog, dao, apitong, amuguis, cubi, banuyo, malaruhat, agoho, supa, palo maria, and banaba.
5. That durability tests of Philippine timbers going into construction work be made whenever possible.
6. That the effort to introduce new species of timber into the markets be continued.
7. That a strenuous effort be made to amend Act No. 1407, so that the free use of lower group timber shall be regulated by the bureau of forestry.
8. That permits be no longer required for clearings on private lands adjoining the public forests.
9. That permits for caiñgins in the public forests no longer be given, and that their place be taken by homesteads.
10. That, in order to encourage the utilization of small logs, which should be removed from the forest, each forester certify to the bureau of internal revenue those timber licensees in his district who can be depended upon to cut small logs without felling trees below the diameter limit imposed.
11. That each forester study the minor products collected in his district and their market value, in order to assist the bureau of internal revenue in imposing a specific tax on those forest products.
12. That efforts be made to introduce American saws, axes, engines, wire cables, and other logging tools.
13. That timber licensees be required to mark their timber in the forest with their own special mark.
14. That exclusive two-year timber licenses be granted to responsible lumbermen when their cutting areas have been mapped and roughly studied by a forester.
15. That foresters inspect personally the cutting areas of large operators, leaving only the inspection of unimportant licensees to rangers.
16. That the foresters make careful observations during the coming year on the influence of deforestation on the climate and waterflow, these observations to be embodied in their next annual report.
17. That the printed forms used by the bureau be amended in such a way as to lessen the paper work of the field force as much as possible.
18. That the Manila office take as much of the clerical work as possible from the district officers, especially in regard to circular letters.
19. That certain forest reserves be recommended as soon as data is at hand sufficient to limit their boundaries, and to justify the request for their reservation.
20. That an educational propaganda be inaugurated; first through the schools; second, by means of stereoptican lectures; third, through the newspapers; and fourth, through general discussion.

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21. That in order to arouse interest in Philippine forestry in the United States, frequent articles or reports be sent to the American forestry magazines for publication.
22. That a course of forestry be established in the new Philippine College of Agriculture.
23. That a hand-book of forestry for rangers be completed as soon as possible by the Committee on publication.
24. That the annual conference of Philippine foresters can be assured of having at least one month in the Manila office.

REDUCTION IN GOVERNMENT CHARGES ON TIMBER.

Heretofore there have been two scales of charges on timber, a higher rate being exacted in provinces where forests have been greatly encroached upon than in abundantly forested provinces. With increased ability on the part of the forestry bureau to inspect and control cuttings, the double rate was deemed unnecessary, and by act 1575, enacted January 1, 1907, it was abolished and the lower scale adopted for the entire archipelago. Under it the government charges range from ₱2 to ₱10 per thousand board feet.

FOREST ACT NOT APPLICABLE TO MILITARY RESERVATIONS.

The Philippines forest act does not apply to military reservations. As large forest tracts were included within some of the military reservations in the Philippines, the question as to whether or not forest laws extended to them, naturally arose. The attorney-general of the Philippines rendered an opinion to the effect that the Commission had no authority to extend the forest laws over such reservations. The matter was referred to the Secretary of War for a final decision, and upon the request of the Bureau of Insular Affairs, the Attorney-General of the United States rendered an opinion, in which he held that the Philippine government can not extend its forest laws to United States reservations in these islands.

EFFECT OF NORZAGARAY RIVER IMPROVEMENT ON TIMBER INDUSTRY.

The large stands of valuable timber on the upper waters of the Bayabas and Norzagaray rivers in Bulacan have been made available by the clearing of the channel of the latter river, which was free for the most part, but was obstructed at several points by huge bowlders, rendering its use for the transportation of logs impracticable. The available forest resources of Bulacan have been greatly increased by this improvement.

USE OF PHILIPPINE WOODS FOR RAILROAD TIES.

It has been contended by Philippine lumber dealers that measures should be taken by the government to restrict the importation of railroad ties from abroad and insure the use of Philippine timber for such ties. There would be much force in this claim were private contractors able promptly to meet the needs of the railroad companies and to furnish ties at a reasonable cost. Unfortunately, there is only one lumber concern in the islands at present which is able to furnish ties in large quantities, and unless a sufficient number of contractors to insure an adequate supply will enter the field, and will install modern lumbering equipment, it would appear that a needless and

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very unjust burden would be imposed on the railroad companies by compelling them to purchase their ties in these islands, since the rate at which they could carry on rail laying would then necessarily depend directly upon the promptness with which local dealers were able and willing to supply the ties needed.

At the outset the Philippine Railway Company issued a proposition and specifications for ties to be cut in the islands. The question of the practicability of furnishing ties in accordance with this proposition and specifications was deemed to be of sufficient importance to warrant investigation by the bureau of forestry, and a forester was assigned to this work. He reported in substance that while at the outset contracts were made by many licensees, and cutting began with enthusiasm, after eight months such cutting had almost stopped in his district, the contractors having found it a dangerous, and often a losing, business, for three reasons: First, the scarcity of the seven kinds of wood which alone were accepted; second, the severe inspection of ties by the railway company and the lack of a market for rejected ties, and third, the low price offered for such valuable timber in the form of ties. He maintained that other species of timber of probably equal durability should be accepted, that the company should, at least at the outset, be more liberal in its inspection, and that the prices offered were too low to afford contractors a reasonable profit, backing up his statements with concrete illustrations.

The purchasing agent for the Philippine Railway Company, after reading the report of the forester in question, attended the foresters' conference in order to discuss the matter of securing railway material, and his company has agreed to cooperate with the forestry bureau in practical tests of the durability of other woods than those at present accepted. It is hoped that these experiments may demonstrate the suitability of a number of additional species for use as ties and that the installation of improved logging plants by local dealers may make it possible for them to meet the needs of railway companies by furnishing ties in sufficient number and at reasonable prices so that large sums of money now sent out of the country may be retained here.

FOREST MAPS.

The important work of mapping the forested areas of the islands is progressing steadily. On this subject the director of forestry says:

The 10 forest districts of the archipelago are divided into plots of 10 kilometers square and each square given a number. Forest officers use as points of reference the places in the district that have been fixed by the coast and geodetic survey.

Each forester while traveling in his district makes constant use of a topographical notebook, compass, and barometer. A reconnaissance sketch is made on each 10 by 10 kilometer sheet as he passes from square to square. At this time the limits of the forests are noted, also the limits of the cultivated and uncultivated lands, condition of roads, trails, streams, etc. The original sheets thus plotted are sent to the Manila office; copies are retained by each forester. The Filipino forest officers are being tried in this class of work and are making satisfactory progress.

More detailed surveys are made of special forest tracts by an assistant forester, who is a competent topographical engineer. On these tracts careful forest studies are made by a field force consisting of one or more foresters, the rangers of the locality, and the necessary laborers.

These reports are prepared for the special use of prospective logging companies.

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PUBLICATIONS OF BUREAU OF FORESTRY.

The following publications have been issued:

Bulletin No. 4. I, "Mechanical tests, properties, and uses of thirty Philippine woods;" II, "Philippine sawmills, lumber market, and prices;" by Rolland Gardner, manager of the timber testing laboratory.

Bulletin No. 5. "Preliminary working plan for the public forest tract of the Insular Lumber Company, Negros Occidental, Philippine Islands," by Foresters Everett and Whitford.

Bulletin No. 6. "Preliminary working plan for the public forest tract of the Mindoro Lumber and Logging Company, Bongabon, Mindoro, Philippine Islands," by Foresters Merritt and Whitford.

Circular No. 1. "Opportunities for lumbering in the Philippine Islands."

The following bulletin will be ready for publication in the near future: "Preliminary check list of the principal timber trees of the Philippine Islands."

The following bulletins are in process of completion: "The first ten timber trees of the Philippine Islands;" "Some Philippine forest types and their commercial possibilities;" "A ranger's primer of forestry."

A second edition of Bulletin No. 4 has been prepared and sent to the director of printing.

REPORTS OF FOREST INVESTIGATION.

The following reports, which add materially to the knowledge of the Philippine forests, have been prepared during the present year:

I. "Report on examination of pine lands, Province of Benguet," by Forester H. M. Curran.

II. "A preliminary examination of the forests of the Kabibihan River basin, province of Tayabas, Philippine Islands," with map, by Forester Wm. H. Kobbe.

III. "Report on forest conditions in the mining region of Aroroy, Masbate, Philippine Islands," with map, by Foresters F. L. Pray and H. M. Whitford.

IV. "An available forest tract in Negros Occidental," with map, by Forester H. D. Everett.

V. "Report on the forests of Danao, Cebu, and timbers used by the Insular Lumber Company," with map, by Forester H. D. Everett.

VI. "A progress report on the investigation of Philippine timbers," by R. Gardner (included in second edition of Bulletin No. 4).

VII. "An available forest tract in northeastern Mindoro," with map, by Forester M. L. Merritt.

TIMBER TESTING LABORATORY.

During the year 11 native timbers and 4 Japanese woods have received a large series of tests. The manager of the timber testing laboratory was, at the request of the secretary of public instruction, sent to Bacolod, Iloilo, Dumaguete, Tagbilaran, and Lucena to inspect

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timbers being used in the construction of schoolhouses at these places. There were disputes as to the classes of wood being employed, and the contractors offered to pay all expenses if the bureau of forestry would send a wood expert to examine and report. It proved that in several places inferior woods, not called for in specifications, as well as inferior grades of the woods called for, were being used.

Further details of the work of the bureau of forestry will be found in the annual report of the director, "Appendix C."

BUREAU OF SCIENCE.

The transfer of the division of ethnology to this bureau has already been referred to. From the date of the organization of the ethnological survey, the men engaged in prosecuting it have been confined to temporary and inadequate quarters; first in the district of Malate, later in the Oriente Building, and finally in the building of the bureau of education. It has never had space for the proper care and display of its collections, and especially during the time when these collections were housed in damp rooms on the ground floor of the mint building their deterioration was rapid and serious. Really adequate quarters have now been made available for this division in the building formerly occupied by the bureau of architecture on calle Anloague, and an ethnological museum has been established there which will soon be open to the public.

NEED OF A COMMERCIAL MUSEUM.

In the opinion of the undersigned, provision should be made in the near future for the establishment of a commercial museum and the display of the valuable collections already gathered illustrating the natural resources of the islands—forest, agricultural, animal, and mineral. These collections should be supplemented by reliable and exhaustive information relative to the resources of the islands. This information might be placed on cards and arranged after the fashion of the ordinary card catalogue, and the cooperation of the bureau of education, the bureau of constabulary, the bureau of agriculture, the bureau of forestry, and the bureau of lands should be secured, in order that it might be made as complete as possible. Such a subject as Philippine coals, for instance, should be illustrated by samples from all known deposits supplemented by statements of all analyses of Philippine coals which have been made, the location of coal beds, cost of labor in the several localities, cost of transportation to the sea or to railroads, and especially the results of practical boiler tests. The same principle should be carried out with reference to all other Philippine products.

INCREASED SPACE NEEDED.

In last year's report attention was called to the present overcrowded condition of the bureau of science building. This building was originally planned for the performance of certain definite kinds of laboratory work, and it was and is amply sufficient for this purpose, but there were added from time to time to the original work

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of the bureau other lines of investigation calling for work other than laboratory work, and the nature of the services rendered by the bureau of laboratories was ultimately so greatly changed and broadened that it became advisable to rename it the Bureau of Science. Apart from the ethnological collections, for which space has now been provided, the botanical, ornithological, ichthyological, entomological, pathological, geological, and mineralogical collections are all large and extremely valuable, and all are rapidly growing. Many of them are stored under such conditions that they are not accessible for study; much less are they open to the public. Material is available for numerous exhibits which would both entertain and instruct the public, but there is no space available for such exhibits, which are at present stored away in dark places, or, worse yet, are occupying rooms in the bureau of science which were designed and equipped for special lines of laboratory work, are greatly needed for such work, and are not at all well adapted to the storage or exhibition of museum material. The rapid increase in the need of laboratory space resulting from the demands made upon the bureau of science by other bureaus and by the public, from the very large amount of chemical work incident to the administration of the pure food and drugs act, and from the necessity for supplying laboratory facilities to the faculty and advanced students of the Philippine Medical School, makes the necessity for using these rooms for the purposes for which they were designed and equipped very great. It will doubtless be possible for the bureau to get on after a fashion for another year, and, in view of the large appropriations which it was necessary to demand for the new general hospital buildings and the new building for the Philippine Medical School, both of which were imperatively and immediately necessary, the undersigned did not feel justified in asking that the existing congestion in the building of the bureau of science be relieved during the present year by the construction of one of the two wings for this building originally planned. He will, however, urge that appropriation be made for this purpose at the beginning of the next fiscal year.

COOPERATION WITH THE PHILIPPINE MEDICAL SCHOOL.

The establishment of the much-needed Philippine Medical School has very materially increased the work which the officers and employees of the bureau of science have been called upon to perform. No less than eight members of the force of this bureau are also members of the faculty of the school, and the director of the bureau is the dean of the faculty. In fact, it may be said that the school could hardly have been established at this time had not the bureau of science, with its thoroughly trained technical men, its excellent medical library, and its admirable facilities for advanced laboratory work existed.

THE LIBRARY.

The library of the bureau of science, which is the central scientific library of the government, has been largely added to during the present year by purchase from funds appropriated by the insular government and from those derived from the sale of photographs, as

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well as by exchanges received for the Philippine Journal of Science, and last but by no means least, by the receipt of valuable donations secured through the activity of the librarian. The library now comprises some 25,000 volumes, exclusive of about 2,000 trade catalogues and 600 maps. Although intended primarily as a reference library, 3,848 volumes have been allowed to go out during the year to responsible and duly authorized borrowers. With the establishment of a new medical school, the use of the library is rapidly increasing.

DIVISION OF BIOLOGY.

The discovery made by members of the bureau of science force that many persons in Bilibid prison were suffering from animal parasites, some of which caused fatal and others wasting diseases, led to the authorization of a section of animal parasitology, which was filled by the appointment of Dr. Philip H. Garrison, detailed from the United States Navy. Important results have already been obtained by him.

In addition to the regular work of the division of biology, a large amount of valuable research work of a practical nature on tropical subjects has been completed. The nature of this work will be found fully set forth in the report of the director of the bureau of science, Appendix D.

SERUM DIVISION.

On January 1, 1907, care of the herd of animals used in the manufacture of antirinderpest serum was transferred to the bureau of agriculture. As soon as the necessary buildings can be completed, the herd will be moved from the San Lazaro estate to the Alabang stock farm, where the availability of a large amount of good pasture land will greatly reduce the cost of maintaining it.

Under the present arrangement, employees of the bureau of agriculture bleed serum animals and separate the serum from the clots. It is then shipped in sterilized 5-liter bottles to the bureau of science, where it is centrifugated, filtered, tested as to sterility, and bottled ready for shipment.

In the past, large quantities of serum have been lost through contamination by organisms during the dry season, when the air is constantly full of dust from the city streets. Filtering of the serum did not prove feasible, as filters promptly clogged. Fortunately it has now been discovered that by centrifugating the serum and subsequently filtering it this difficulty is overcome. All serum is now treated in this manner and losses from contamination are avoided. A new apparatus has been ordered, which, it is hoped, will make it possible to centrifugate the blood without waiting for the formation of clots. This should increase the yield of serum sufficiently to save the cost of the centrifuge in about a year after its installation.

The serum division has furnished antidiphtheritic and antitetanic serum, cholera prophylactic, plague prophylactic, and mallein as required. It will soon have ready for distribution the serum for bacillary dysentery and that for typhoid fever.

All efforts to isolate the organism causing rinderpest have thus far resulted in failure, but it has been absolutely proved that the infectious material in the blood of animals suffering from this disease will not pass through the Berkefeld filter. In other words, the

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filtrate from this blood is harmless when injected into a nonimmune animal. Objects large enough to be stopped by such a filter ought to be visible under the highest powers of the microscope if properly stained, and it is hoped that it may ultimately prove possible to isolate and cultivate the organisms causing this disease. Were this possible the cost of producing antirinderpest serum would be very greatly reduced, as the necessity for perpetuating the disease by constantly transferring from one nonimmune animal to another would be obviated.

BOTANICAL DIVISION.

Important results were obtained by Mr. Merrill, chief of this division, on an expedition organized by Maj. Gen. Leonard Wood, which ascended Mount Halcon in Mindoro.

Eight thousand, seven hundred and forty-nine sheets of local material and 7,226 sheets of foreign material have been added to the herbarium during the year. A large series of wood samples has been collected, properly identified and labeled, with herbarium specimens to accompany them, and the task of identifying Philippine timbers has thus been rendered much less difficult. Several thousand determinations of wood specimens have been made for the bureau of forestry and during the last five months of the year the work of the timber-testing laboratory at Bilibid Prison has been conducted by an employee of the botanical section of the bureau of science.

ENTOMOLOGICAL SECTION.

The most important work of the entomological section during the year has been practical investigation as to the sources of malarial infection at various points in the islands, with the recommendation of measures calculated to end such infection, and the successful introduction of silkworms.

ZOOLOGICAL SECTION.

Field work has been pushed during the year by the working force of this section and a large amount of valuable museum material has been secured. Two important exchanges of specimens have been arranged with other museums and a considerable amount of material has been sold for cash.

FISH AND FISHERIES.

The employment of Mr. Alvin Seale has been referred to elsewhere in this report, and the services rendered by him since his arrival have been briefly outlined. In addition, it should be stated that he is rapidly pushing the work upon a catalogue of fishes, which contains the native, English and scientific names of each species known and such information as is available as to where and at what season it is to be found, where its eggs are deposited, how its young develop, what food it requires, methods of capture and preservation and its market value, as well as suggestions as to future investigations, if such investigations seem likely to yield profitable results. In connection with this catalogue, an identified collection has been started which already

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numbers some 3,200 specimens and represents approximately 630 species, 35 of which are new to science.

Mr. Seale has also found the valuable "sheep's wool" sponge of commerce in Philippine waters.

CHEMICAL DIVISION.

During the year it has been found necessary to divide the chemical laboratory into 2 sections: A section of general analytical work and organic chemistry, and a section of weights and measures and mineral analyses.

SECTION OF GENERAL ANALYTICAL WORK AND ORGANIC CHEMISTRY.

The routine work of this section has greatly increased. Approximately twice as many analyses as were made during the previous year have been required. A detailed account of the work performed will be found in the annual report of the director of the bureau of science, "Appendix D." Among other important practical results obtained may be mentioned the demonstration by Doctor Richmond of the practicability of applying the sulphite process in the preparation of paper pulp from hemp waste and Philippine grasses. Mr. Richmond has not only demonstrated that excellent paper can be prepared from cogon grass, bamboo, hemp waste, and from a number of Philippine woods, but has furnished reliable data as to the cost of erecting a paper mill, the expense of operating it, including the outlay necessary for the importation of chemicals, and has considered the availability and cost of the several raw materials above mentioned. The field for the establishment of an important paper manufacturing industry in these islands has thus been fully prepared. As one result, hemp waste, which was formerly thrown away, is now being purchased and exported in considerable quantities, the exportations from Manila for the period covered by this report being 515 tons valued at ₱40,166.

SECTION OF WEIGHTS AND MEASURES AND MINERAL ANALYSES.

Act No. 1519 of the Philippine Commission, regulating the inspecting and sealing of weights and measures, took effect during the year and the work of standardizing has begun. All weights, measures, and instruments of precision which have gone, or are to go, to the provinces to serve as secondary standards have been compared, and measuring flasks have been marked.

The charge for assay work has been reduced, not because the original charge was unreasonable, but because it seemed desirable to stimulate the development of our infant mineral industry by giving miners an opportunity to have assays made practically at cost. The present charge for a gold assay is ₱2. As a result, the number of assays made has increased more than 200 per cent. The number of coal analyses and of calorific determinations has also increased, owing to the interest being taken in Philippine coals. It was 75 as compared with 15 for the previous year. These figures do not include the work done for the division of mines or for other bureaus of the government, or for purposes of research, but represent that performed for private individuals for pay. Doctor Cox has shown that Philippine coals

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can be successfully used in the manufacture of producer gas with resulting greatly increased efficiency; and in order to afford a practical demonstration of the value of this process and to reduce the cost of fuel used by the bureau of science, the Commission has made appropriation for the establishment of a producer gas plant for that bureau.

DIVISION OF MINES.

On July 1, 1906, Mr. H. D. McCaskey, formerly chief of the division of mines, went on leave to the United States. Owing to ill-health he subsequently resigned without returning to the islands. Mr. Eveland resigned on January 15 of this year; and Mr. Ickis was absent on leave from August 2 to February 22, so that from July to September there was but one man in the field. The work of this division has therefore been greatly handicapped. Mr. Smith was, however, able to visit north Ilocos and to investigate the asbestos and manganese deposits in that province. In December he began the large undertaking of making a geologic map of the coal regions of Compostela and Danao in Cebu. In January, Mr. Goodman joined him to aid in this work. He has since made a reconnoissance of Mount Pinatubo in Zambales province and of the region in its vicinity, When Mr. Ickis returned he was immediately dispatched to Camarines to make a preliminary inspection of the gold region in the vicinity of Paracale and Mambulao. From there he went to the island of Polillo to inspect the coal workings; thence overland from Infanta to Manila.

Mr. Ferguson, who took Mr. Eveland's place, has spent a large amount of time in petrographic work and has carried on field work in the Batanes Islands and the island of Camiguin in the Babuyanes group, the results of which will shortly be published.

It is proposed in the future to abandon the former policy of minute, detailed and expensive surveys of particular regions, which, while of great scientific value, do not cover a sufficient amount of territory to insure the making, within a reasonable time, of a reconnoissance of the geology of the Philippine Islands. The work at present planned is: (1) Geological reconnoissance work; (2) the investigation of economic materials, chiefly of fuels and materials for construction; (3) statistical work; (4) mapping.

It is proposed to issue at the close of each calendar year a statistical bulletin on the mineral resources of the Philippines, showing fully the results obtained during the year and the value of the business done.

BUREAU OF LANDS.

There has been a great increase in the demands upon this bureau, and although the number of employees has been increased from 316 to 637, it has been found impossible to keep up with current work.

FRIAR LANDS.

Administration of the Friar estates has been considerably hampered by political agitation in connection with the recent election for assemblymen; tenants have been assured that the coming assembly would deliver over the Friar lands to the occupants thereof free of

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cost. By the more unscrupulous agitators they have been told that war was about to break out between the United States and Japan; that the Japanese would take possession of the islands; and if the payment of rents were delayed it might be avoided altogether. Tenants who believed either the one or the other of these statements were naturally reluctant to pay their rent, but notwithstanding these disturbing influences the greater part of all estates devoted to rice culture is now occupied and leased. The portions formerly planted in sugar are practically abandoned owing to a variety of causes. Most of this land has remained uncultivated for ten years and is covered with a dense growth of vegetation which can be removed only by hard work and at large expense. The scarcity of draft animals renders cultivation of such land impossible for many tenants. Mills, machinery, and warehouses were in many instances burned during the war or allowed to fall into a ruinous state; tenants have not sufficient funds with which to meet these conditions, and are unable to borrow, except at ruinous rates of interest; and finally, under existing conditions as to markets available there is little encouragement to grow sugar.

Another source of difficulty has been encountered in the decisions of justices of the peace as to who were the bona fide occupants in possession of Friar lands at the date of purchase by the government. The object of the government in purchasing the Friar lands was to get them into the hands of the actual tenants, many of whom were, and are, very poor. Unscrupulous persons of means who desire to gain control of large tracts of the choicest lands, attempt to establish the fact of occupation before justices of the peace, and, being represented by adequate counsel, very frequently win cases which they ought to lose, the tenants who are thus cheated out of their rights being too ignorant or too poor to employ adequate counsel or to appeal their cases to the higher courts.

All the estates have been registered under the mortgage law in the provinces where they are located. The San José estate has been registered under the land registration act, and the Matamo, San Marcos, and Dampol estates are now before the court of land registration; other estates will be entered as fast as surveys are completed and the necessary information on which to base an application for registration is available.

In the report of the director of lands will be found a tabulated statement showing the progress made on each estate in leasing lands, the current expenses, the nonrecurrent expenses, the receipts, and the deficit for the year ending June 30, 1907.

There has been an increase of 3,459 leases, covering a total area of 6,207 hectares. The increase in the revenues collected for the year amounts to ₱127,966.33; the cost of administration for the purposes included in last year's report has increased but ₱1,964.79. The expenses of irrigation, however, have increased ₱11,006.52, owing to the employment of ditch tenders and laborers to keep the system in better condition. The expenses of surveying during the year were ₱206,489.18, an increase of ₱122,924.55, this difference being caused by the fact that more surveyors were employed, in order that the surveys might be completed as soon as possible.

Important repairs to irrigation works on the estates have cost ₱13,861.96. During the coming year the expense of administration

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will probably be somewhat reduced, but the expense of irrigation will remain practically the same.

The extraordinary, or nonrecurrent expenses for surveying and drafting will be increased during the year, but it is expected that the work of surveying will be finally completed before July 1, 1908.

LEASES AND SALES OF FRIAR LANDS.

The leases first issued to the tenants on Friar estates were for periods of one year only, one of the main objects in issuing such leases being to secure an acknowledgment of the government's title by the occupants. At the outset it was usually necessary to accept the statement of each lessee as to the number of parcels occupied by him and the area of each such parcel. As surveys have progressed and the real number of parcels occupied by lessees, with the true area of each, has been ascertained, old leases have been canceled and others executed in their place. In the large majority of cases it has been found that the lessees greatly understated the amount of land which they were occupying. Frequently the excess amounts to 100 per cent or more, and the increase in the total rental is considerable. Malicious persons have circulated the report, which has been generally believed by the ignorant, that the government was increasing the rate of rental, which is not true. Many lessees have refused to take out new leases covering the true amounts of land occupied by them, claiming that they are absolutely unable to pay the increased charge. At the same time they have demanded that the lands be sold to them at once. The rental is aproximately 4 per cent of the purchase value of the land occupied. If the lands were sold to the tenants they would, under existing provisions of law, have to pay 10 per cent of the full value annually and in addition thereto 4 per cent on deferred payments, which would amount to far more than they are now paying. If the claims of tenants that they can not pay the rents due are true—and it is known that many of them are substantially true—it is evident that they would be still less able to pay the purchase price in 10 annual installments.

It is the opinion of the director of lands that it will be impossible, except on a few of the smaller estates, to carry out the provisions of act No. 1120, by selling parcels of land in the manner now provided by law. Tenants would have to pay annually from 4 to 6 times the amount they are now paying as rental. The director of lands therefore urgently requests that act No. 1120 be so amended as to extend the time of payment to thirty years, so that the bureau of lands may make contracts with tenants to suit their financial condition, thirty years to be the maximum term of payment for any parcel of land, and deferred payments to bear interest at 4 per cent per annum. This would increase the total interest paid, but would reduce the amount of annual payments to such an extent that the tenants should be able to make them; yet, even on this basis, the annual payment per hectare would be about double the annual rental now charged.

In the report of the director of lands will be found a detailed estimate of the approximate amounts of readily saleable land on each estate. The total sale value of all estates, excluding improvements, as fixed by law, was on June 30, 1907, ₱14,337,400. The director of lands estimates the aggregate value of the saleable land on the same

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date to be ₱10,239,500. The government, therefore, has approximately ₱4,000,000 invested in land which is not readily saleable, either through its being wild land or, as in the case of the San José and Isabela estates, on account of lack of occupants.

The value of all irrigation systems and other improvements on the estates is approximately ₱1,000,000, so that the government has invested some ₱5,000,000 in property which for some time to come will neither be sold nor produce any great amount of revenue, and which costs annually at least ₱200,000 in the form of interest on bonds.

EXTENSION OF CULTIVATED AREAS ON FRIAR ESTATES.

Cultivated areas on the occupied estates are being increased, but the process is slow, owing to the fact that tenants lack capital for purchasing draft animals, seed, farm implements and machinery. The director of lands believes that under existing conditions ten years will elapse before as large an area is brought under cultivation as was cultivated prior to 1895. The difficulty is especially great on estates formerly given over largely to sugar culture. The director of lands suggested the loan to tenants of funds to be used in paying the cost of cultivating their land, on mortgages covering growing crops and salable commodities manufactured therefrom, and on work animals, warehouses, mill houses, machinery, and other property, both real and personal, situated on the Friar estates. The insular auditor, the director of agriculture, and the director of lands were instructed, by resolution of the Commission, to prepare an act covering this subject and a carefully prepared plan was submitted to the Commission, together with an act for carrying it out. The Commission has made available ₱100,000 to be used in demonstrating the practicability of the working plan adopted, which will be found set forth in detail in the report of the director of lands.

IRRIGATION SYSTEMS ON FRIAR ESTATES.

The sum of ₱25,000 has been expended by the bureau of engineering and public works for the restoration of irrigation works on the estates in La Laguna and Cavite provinces. These irrigation works are now in fair condition and are furnishing all the water required. During the coming year ₱60,000 will be expended in repairs to important dams and tunnels, and further extensive repairs should be unnecessary for some time to come. The insular government will retain ownership of the irrigation system and it is believed that when the area of each person's holdings on irrigated estates is known, sufficient fees can be collected to maintain the irrigation works and cover the interest and sinking fund on the capital invested in them.

RAILROADS ON FRIAR ESTATES.

Two lines of railway, which are rapidly approaching completion, cross the estates of Muntinlupa, Biñan, Santa Rosa, Calamba, Imus, San Francisco de Malabon, Santa Cruz de Malabon, and Naic, as well as the 2 estates in the province of Cebu. These roads will furnish much needed facilities for transporting crops to market; will open areas hitherto practically inaccessible, and should increase the value of the estates and the returns derivable therefrom prior to the date

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of sale. The railroad companies will pay for lands occupied by them, as provided in the Friar lands act, and have already settled with many of the tenants for damage done to their improvements.

DETAILED STATEMENT OF CONDITIONS ON EACH FRIAR ESTATE.

A detailed statement of the conditions on each of the estates as regards leased areas, surveys, cultivated areas, and agricultural conditions in general, will be found in the report of the director of lands (Appendix E).

PUBLIC LANDS.

During the year employees of the bureau of lands, bureau of education, and bureau of forestry and officers of the constabulary, have aided the bureau of lands in a concerted movement for the dissemination of knowledge relative to public lands among the common people. The bureau of lands has distributed more than 20,000 circulars and has kept 3 agents in the field to explain the laws, assist in the preparation of applications, inspect lands, and investigate contests. As a result, the number of applications for land has greatly increased, the total being 12,029, as compared with 3,392 for the entire previous period, or since October 7, 1903. Of these, 2,669 were for homesteads; 8,607 for free patents; 86 for sales; 12 for leases; 136 for coal claims; and 519 for mineral claims. A full account of the operations under each one of these heads will be found in the report of the director of lands.

HOMESTEADS.

The average area of homesteads applied for has been a trifle more than 11 hectares, which is doubtless far more than the average man will be able to cultivate. Not all homestead applications have been bona fide. Applications are filed for parcels of land which the applicants sell to whoever will purchase them, after raising 1 or 2 crops. In other cases they cut the timber on the land applied for, without any intention of perfecting title to the homestead. In some instances they even use their homestead entries as roving commissions to cut valuable timber anywhere in the vicinity, and when they bring such timber to market, declare that it has been cut on the land described in their entries, in order to avoid payment of government charges. "Caciques" have obliged those dependent upon them to apply for land under the homestead law, with a view to getting actual control of such land from the outset, and to ultimately acquiring title to it at a nominal cost. Much patience is necessary in dealing with these conditions, but it is being exercised and the people are gradually being instructed.

Taking the average area of a homestead at 11 hectares, the director of lands estimates that the cost of the survey made by the government is 3 pesos per hectare, and that the average cost of clerical work and investigation during the five years before the entry can be allowed will make the total cost to the government for each homestead entry perfected and surveyed approximately 50 pesos, for which it will receive in return 20 pesos in fees, leaving the net cost to the government for each perfected homestead application approximately 30 pesos.

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SALES OF PUBLIC LAND.

The 86 sales applications received during the year covered an area of 2,697 hectares. The total sales applications from the passage of the public land act (October 7, 1903) to date have numbered 168, covering an area of but 4,987 hectares. Of these only 152 proved to be bona fide. Three were for an area of less than 1 hectare each; 24 for areas varying from 1 to 5 hectares; 40 for areas of from 5 to 16 hectares; and 52 for 16 hectares only. Thirteen were from corporations, and averaged 267 hectares each.

AN AMENDMENT TO THE PUBLIC LAND ACT NEEDED.

Under the present law individuals and corporations are restricted to the purchase of 1 tract only of public land each. Basing his opinion on past experience, the director of lands believes that both individuals and corporations should be allowed to purchase as many contiguous tracts as they may desire, provided the total area purchased does not exceed the area which may lawfully be sold to a corporation or individual. The undersigned fully concurs in this view. The advantage of so amending the law as to admit of such purchases would be that an applicant would purchase such a tract as he could at the time afford, and after it was brought under cultivation and his resources were increased could extend the limit of his holdings. It is believed that the classes of people and of corporations who would take advantage of such a provision are those which would assist materially in the development of the agricultural resources of the country, and no objection to it is seen.

LEASES OF PUBLIC LAND.

Only 12 lease applications for a total area of 5,921 hectares were received during the year; 10 had previously been received, making a total of 22, which cover an area of 12,279 hectares. Six of these applications, for 3,798 hectares, have already been withdrawn, and the balance are in various stages of progress. Lack of surveyors has greatly delayed the execution of leases.

FREE PATENTS TO NATIVE SETTLERS.

Eight thousand six hundred and seven free patent applications were received during the year, as against 730 for the entire previous period since October 7, 1903. The average area applied for is 3⅛ hectares. Of the total number of applications received, 1,061 have been rejected, canceled, or withdrawn; 6,775 are ready for survey and investigation, and the balance are in various stages of completion.

Act No. 1573, enacted December 13, 1906, extended the time within which free patent applications could be made. The director of lands objected to such extension, and in his annual report renews his objection to further extensions, for the reason that in his opinion practically all property holders outside of the non-Christian provinces who could comply with the provisions of this chapter have been in possession of their lands a sufficient length of time to avail themselves of chapter 6 relative to unperfected titles. The director of lands

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seemingly overlooks the fact that the non-Christian peoples constitute approximately one-eighth of the total population of the Philippines; that, in most cases, they remain entirely ignorant of the provisions of the land law until these provisions are verbally explained to them; and that they are, in nearly all instances, unable themselves to make out their applications, so that it would seem that they are entitled to fairly liberal treatment.

The director of lands estimates the cost to the government of each free patent survey at 10 pesos, and the cost of investigating the right of an applicant to such patent, the clerical work in relation thereto, and the issuance of the patent at 20 pesos. If these figures are correct, each free patent issued will cost the government 30 pesos. It must not be supposed from the fact that 6,775 applications are pending investigation and survey, that any such number of free patents are likely to be granted. It is practically certain that hundreds of the applicants have no right to avail themselves of the provisions of this chapter.

TOWNSITES.

Up to the close of the last fiscal year the Baguio townsite was the only one which had been surveyed—2,995.38 hectares being added to this townsite reservation during the year—making the total area 5,595 hectares, or 21.6 square miles. A third subdivision of lots has been surveyed and platted, and will soon be placed on sale. Most of the persons who purchased lots at the second sale were in no way connected with the government, which fact has a bearing on the statement so often made that Baguio would be used only by government officers and employees.

Camp John Hay, the Baguio military reservation, has recently been increased in size by executive order of the President.

Six additional townsite reservations are now receiving the consideration of the bureau of lands. Of these, 4 are in the Moro Province, one at Olongapo, in Zambales Province, and one at Sibul Springs, in the province of Bulacan.

UNPERFECTED TITLES.

Notice of 367 applications presented to the court of land registration, by persons desiring the benefits of chapter 6 of the public land act, have been received by the bureau of lands. Investigation of each of these cases has led the bureau to request the attorney-general to enter appearance in 128 cases and opposition in 54. In the opinion of the director of lands, the applicants in the other cases were entitled to the registration of their property, or the land involved was not of sufficient value to warrant opposition by the government. Experience has shown that rigorous investigation is necessary where applications cover very large areas of land. In many instances efforts are made to secure very extensive tracts to which the applicants have not the shadow of claim.

MINERAL AND MINING CLAIMS.

One hundred and thirty-six new coal entries, covering an area of 8,156 hectares, have been recorded, in addition to the 150 entries, covering 9,139 hectares, filed previous to this fiscal year, making the

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total entries 286, covering 17,295 hectares; but 143 entries that were pending action at the close of the previous year were canceled, as the applicants failed to complete their entries within the year. This serves strongly to emphasize the recommendation made in the last annual report of the undersigned that applicants be allowed two years in which to complete their entries, on account of the great delay resulting from imperfect means of communication and of the difficulty in securing expert investigation.

Of the entries filed during the year, 18, covering 1,052 hectares, are now undergoing survey. Two have been perfected and patents issued. It is believed that a number of others will be perfected during the year.

There were 427 lode claims and 92 placer claims filed during the year, and prior to the beginning of the year there were filed 1,174 lode claims and 441 placer claims, making a total of 1,601 lode claims and 533 placer claims filed up to June 30, 1907.

In the report of the director of lands will be found a table showing in each case the kind of claim, the mineral, and the province where located.

Twenty-one applications for survey have been received. These surveys are nearly completed and patents will presumably issue immediately.

SURVEYS.

Seventeen thousand one hundred and sixty-eight parcels of land, with a total area of 68,573 hectares, have been surveyed, at a cost of ₱211,563.69. The average area of each parcel surveyed was approximately 4 hectares; the average cost was approximately ₱3.08 per hectare.

The large cost of surveys is the direct result of the small size of the parcels. In spite of the large amount of work done, the bureau is badly behind with its surveys. A considerable increase in the surveying force has been authorized.

On the Friar estates, 62,239 hectares have been surveyed during the year, making a total of 95,528 hectares surveyed to date, and leaving unsurveyed 63,144 hectares.

The cost of surveying Friar lands has ranged from ₱0.52 to ₱7.31 per hectare, the average being ₱3.09.

The difficulties encountered in making Friar land surveys are most graphically shown in the report of the dircetor of lands by the submission of a map of the Orion estate, which covers an area of 901 hectares, and is divided into 651 lots. Reference to this map will show that many of these lots have very numerous corners, and most of them have banana, bamboo, mango, or other trees or rice stacks along their boundaries, so that any attempt to change these boundaries, or introduce a system of rectangular surveys, meets with vigorous objection on the part of the tenants. This condition of things makes surveys far slower and more expensive than would be the case if a rectangular system could be employed.

Only 2 regular parties have been kept in the field on public land surveys during the year. One consisted of a high-salaried, experienced American surveyor and an American transit man; the other of a Filipino surveyor and Filipino transit man. The average cost per hectare of the surveys made by the first party was ₱1.71;

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that of the surveys made by the second party was ₱2.91, showing that experienced men, although high-priced, accomplished their work at lower cost per hectare than did men with less experience, who received materially lower salaries.

SAN LAZARO ESTATE.

The entire San Lazaro estate has been subdivided into 116 blocks, exclusive of the hospital reservation. Seventy-three blocks have been surveyed and subdivided into building lots; 10 have been partially subdivided; 22 blocks suitable for building purposes remain to be surveyed and subdivided; and 11 blocks are so situated that the lands are only suitable for agricultural purposes.

All efforts to secure from the city proper drainage, adequate water supply, street lighting, sanitary arrangements, and the improvement of streets, have ended in failure. The attitude of the municipal government seems to be that it will spend no funds on improvements in this district, for the reason that the government does not pay taxes on the property. A number of blocks, otherwise suitable for residences, are at present absolutely unapproachable during wet weather. In view of the fact that the insular government is doing all of the health work for the city, and is caring for numerous insane, leprous, and other helpless residents, an effective remedy would readily suggest itself. Unless the city adopts a more reasonable attitude in this matter, the undersigned recommends that the remedy be promptly applied. In this connection, it should be noted that the income from the San Lazaro estate is devoted to charitable purposes, being expended for the care of lepers and of persons suffering from other dangerous communicable diseases, so that even were this estate not in the hands of the insular government, it would still not be subject to taxation.

At present 2,629 of the lots on this estate are occupied. Two hundred and seventy-seven tenants occupying 425 lots, were added to the rent roll during the year. There has been material improvement in the general character of the buildings on the estate. Many of the old houses have been repaired and enlarged, and the erection of twenty buildings of strong materials, and 149 of light or mixed materials has been authorized.

The total rentals derived from the estate were ₱53,467.37, as against ₱50,243.75 for the preceding year, an increase of a little more than six per cent.

The delinquent rent roll on June 30, 1907, amounted to but ₱2,339.59, most of which is probably collectible.

The director of lands recommends that all lands which the Commission has ordered reserved in this estate for the extension and improvement of streets be formally conveyed to the city of Manila, free of cost, but with the provision that the municipality shall within the next two years, at its own expense, establish a good street system, the total cost of which will not be less than the assessed value of the lands so conveyed. The undersigned concurs in this recommendation.

The annual report of the director of lands, submitted herewith (Appendix E) covers very fully the operations of his bureau for the year, and much of the important information will be found submitted in concise, tabular form.

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BUREAU OF AGRICULTURE.

PERSONNEL.

The bureau of agriculture has been shorthanded throughout the year. Its former director, Mr. W. C. Welborn was granted leave of absence with permission to visit the United States on account of illness, and sailed from Manila on March 19, 1907. He had been in bad health for some time prior to his departure, and failure to recuperate in the United States as rapidly as had been hoped subsequently caused him to tender his resignation. The assistant director, Dr. George E. Nesom, who was also serving as chief of the division of animal industry, was therefore compelled to perform the additional duties of director during the last three and one-half months of the year. Upon Mr. Welborn's resignation he was made director, but no assistant director has as yet been appointed.

LOSS OF VETERINARIANS.

The taking effect of the meat inspection law in the United States and the subsequent greatly increased demand for veterinarians has resulted in the loss of nearly the entire veterinary force employed by the bureau a year ago, only three of the old men remaining. Five veterinarians have been induced to come out from the United States to fill vacancies, but a considerable additional number is urgently needed.

AGRICULTURAL INSPECTORS.

Six agricultural inspectors authorized in the appropriation bill for the fiscal year 1907 arrived during November and December, 1906, and after a preliminary period of instruction were assigned in January to their several stations. They have all rendered valuable service, especially in dealing with animal diseases. It is essential that those who are sent to suppress outbreaks of infective animal diseases should arrive on the ground promptly, and the undersigned is of the opinion that the number of employees should be so increased that there would be at least one veterinary inspector, or assistant inspector, for each province in the Archipelago. In view of the difficulty of securing competent veterinarians, it is believed that early consideration should be given to the question of the advisability of establishing here a veterinary school.

INCREASED EFFICIENCY OF FILIPINO EMPLOYEES.

The director of agriculture reports that his Filipino clerical force is steadily increasing in efficiency, and as a result of satisfactory service rendered a number of Filipino clerks heretofore temporarily employed have been given permanent appointments in the classified service.

SUPERINTENDENT OF AGRICULTURAL EXTENSION WORK.

It has long been the opinion of the undersigned that the bureau of agriculture was failing to get sufficiently closely in touch with the people, and that as a result some of its efforts were misdirected while

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the results of others, although of great importance if generally known, were failing to reach those who should most largely profit by them. It is highly important that this bureau should direct its efforts toward the solution of problems which are of practical importance to the people, and that the results of this work, when successful, should become known promptly and widely. With a view to remedying this difficulty to some extent, the former director of agriculture was instructed to prepare for and hold a series of "farmers' institute" meetings in the more important provinces. This proved impossible on account of the shortage of officers and employees, and for other reasons. This plan will, however, be carried out when the working force has been recruited up to such a point as to make it possible. Meanwhile, it was believed to be desirable to provide a position which might be filled by a Filipino of known experience and ability, who would on the one hand familiarize himself with the practical results obtained by the bureau and make them known to the people, and on the other would keep the bureau more closely in touch with public needs. The position of superintendent of agricultural extension work was accordingly created in the appropriation bill for the fiscal year 1908, and was at once filled by the appointment of ex-Governor Pablo Tecson of Bulacan Province, who, through his practical knowledge of agricultural matters, had already been able to render the government very valuable service as a member of the central equalizing board, one of whose duties it was to fix the proper rates of taxation on agricultural lands.

PUBLICATIONS.

The following publications have been issued:

Title.	Author.	Issued.	Language.
FARMERS' BULLETINS.			
No. 13: Cultivation of maguey in Philippine Islands (reprint).	H. T. Edwards	Aug. 27,1906	English.
No. 14: El cultivo del sesamo en Islas Filipinas	Wm. S. Lyon	Aug. 29,1906	Spanish.
PRESS BULLETINS.			
No. 8: Maguey, propagating abaca from seed, etc.	H. T. Edwards	Nov. 9,1906	English.
No. 9: Bureau of agriculture districts of the Philippines, control of rinderpest, etc.	G. E. Neson	Feb. 5,1907	Do.
No. 10: The weevil pest and its remedy, maguey, etc.	H. T. Edwards	Apr. 24,1907	Do.
No. 10: La plaga de gorgojos y su remedio, maguey, etc.	do	do	Spanish.
CIRCULARS.			
Instructions for planting field and garden seeds	Wm. S. Lyon	July 19,1906	Spanish.
Maguey	H. T. Edwards	July 27,1906	English.
Do	do	do	Spanish.
Do	do	do	Ilocano.
Do	do	do	Tagalog.
Do	do	Sept. 12,1906	Bohoiano.
Maguey (reprint)	do	do	Tagalog.
Do	do	do	Spanish.
Maguey	do	Nov. 8,1906	Masbate.
Do	do	Apr. 24,1907	Cebuano.
No. 1: Crop Report Service	do	Nov. 11,1906	Spanish.
Do	do	do	English.
Instructions for planting seeds (reprint)	Wm. S. Lyon	Mar. 19,1906	Spanish.
Maguey (reprint)	H. T. Edwards	May 16,1906	English and Spanish.

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Since the close of the fiscal year, a popular bulletin on kapok has been issued, and a similar bulletin on dangerous communicable animal diseases is ready for the press. The highly gratifying results which have followed the publication of the original maguey bulletin and the efforts of the bureau of agriculture to stimulate the cultivation of this valuable fiber plant, have led to the hope that the pursuit of a similar policy designed to increase the production of kapok, corn, rice, pineapples, cacao, and sesamum may lead to similar results.

CROP REPORTS AND STATISTICS.

The statistician provided for in the appropriation bill for the fiscal year 1907 was appointed and assigned to the duty of organizing and supervising the crop reporting service throughout the islands. He recommended the division of the archipelago into agricultural districts, with a corps of municipal, provincial and district reporters, the latter to be regular agricultural inspectors, and to have general supervision of the work of all reporters in their respective districts, each reporter to furnish a monthly and an annual report on the agricultural conditions within his municipality, province, or district; abacá, maguey, sugar, rice, copra, and tobacco being the crops to be regularly reported upon; live stock also to be reported on, with special reference to the occurrence of diseases. Unfortunately, Mr. B. L. Moss, who was appointed statistician, was disabled by amœbic dysentery, and compelled to leave the service. Pursuant to the policy outlined by him, the bureau of agriculture has established nine agricultural districts as follows:

District No. 1.—Includes Cagayan, Isabela, and Nueva Vizcaya. Headquarters, Tuguegarao; substation, Ilagan.

District No. 2.—Includes Ilocos Norte, Ilocos Sur and Union. Headquarters, Vigan; substations, Laoag, and San Fernando (Union).

District No. 3.—Includes Pangasinan, Benguet, Lepanto-Bontoc, and Tarlac. Headquarters, Dagupan; substations, Baguio, Cervantes, and Tarlac.

District No. 4.—Includes Zambales, Bataan, Pampanga, Nueva Ecija, Laguna, Rizal, Manila, Cavite, Batangas, Tayabas (part on west coast), Mindoro, Palawan, Marinduque, Romblon, and Bulacan. Headquarters, Manila; substations, Iba, Lamao, San Fernando (Pampanga), San Isidor, Batangas, Lipa, Lucena, Santa Cruz (Laguna), and Alabang.

District No. 5.—Includes Camarines, Albay, Sorsogon, Masbate, and Tayabas (part on east coast). Headquarters, Legaspi; substations, Nueva Cáceres, Sorsogon and Masbate.

District No. 6.—Includes Samar and eastern Leyte. Headquarters, Tacloban; substation, Catbalogan.

District No. 7.—Includes Cebú, Negros Oriental, Bohol, Misamis, Surigao, Agusan, and western Leyte. Headquarters, Cebú; substations, Tagbilaran, Dumaguete, Cagayan and Surigao.

District No. 8.—Includes island of Panay and Negros Occidental. Headquarters, Iloilo; substations, Silay, La Carlota and Capiz.

District No. 9.—Includes Moro Province. Headquarters, Zamboanga; substation, Davao.

The reports received were at first few in number, and more or less unsatisfactory in substance. In view of the fact that municipal and provincial reporters were for the most part inexperienced in such work and served without pay, this was to be anticipated.

On June 30, 1907, 370 municipal reporters were representing 308 municipalities, and a total of 1,628 reports had been received. The character of these reports is steadily improving, and they should

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soon afford sufficient data to justify the publication by the bureau of agriculture of a consolidated monthly crop report.

An especially important feature of this work is that it gives the bureau a large number of reliable agents throughout the provinces to whom bulletins and reports can be sent and who will aid materially in bringing the results of its investigations to the attention of the common people.

SEED AND PLANT DISTRIBUTION.

Interest in seed and plant distribution steadily increases, and the amount of seed and plants sent out has far exceeded that of any previous year. Applications for farm seeds proper were 42 per cent of the total applications, as against 20.5 per cent for the previous year and this change in the nature of the applications was especially gratifying. The distribution of sesamum, Carolina golden rice, peanuts, field corn, and maguey were the most important made. At its Singalong station the bureau for the first time succeeded in raising seed corn that was in all respects fully up to the standard type procured from the United States. A part of the sesamum seed was donated by M. Edouard Vidal of Manila. Seeds and plants were sent to 3,078 different persons, in 519 different towns or settlements, and reached every province in the Archipelago.

DISTRIBUTION OF MAGUEY.

The introduction and distribution of Hawaiian sisal plants, the issuance of publications on maguey by the bureau of agriculture, and the personal efforts of its agents, have given a tremendous impetus to the cultivation of this valuable fiber plant in the provinces which have well-drained soils and where a prolonged dry season renders the cultivation of abaca impossible. The Hawaiian plants first introduced are now coming to maturity and are yielding a high percentage of excellent fiber and the demand for additional plants is greatly in excess of the supply. The first lot of 50,000 was received in July, 1906, and these were distributed in 8 provinces. The second lot of 50,000 arrived in August, 1906, and were distributed in 18 provinces. The third lot of 120,000 was received in November, 1906. Of these 15,000 were sold to the Moro Province at cost, 10,000 were furnished the bureau of lands for distribution on Friar estates, 5,000 were planted at the Lamao experiment station of the bureau of agriculture and the remaining 90,000 were distributed in 33 provinces. Provincial governors, teachers, and other responsible persons have aided in the distribution and it is known that a total of 37 provinces and 196 municipalities, including 502 individuals, have received Hawaiian maguey plants. Doubtless the ultimate distribution of these plants has been much more widespread than these figures would indicate. The total requests for maguey plants at the end of the year numbered 1,342, and came from 43 provinces and 381 municipalities. In order to meet the increasing demand, half a million poll plants were ordered in February, 1907, from the Hawaiian agricultural experiment station, to be delivered in Manila during July and August.

Not only has Hawaiian maguey been introduced upon the above-outlined extensive scale, but active measures have been taken to

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facilitate the securing of plants of Philippine maguey by those who desire to start plantations. While this latter variety produces a lower percentage of fiber than does that from Hawaii, the fiber is longer, finer, and of good strength. Great difficulty was experienced by farmers in obtaining young plants in sufficient numbers. The bureau of agriculture therefore took the matter up, systematized it, and has arranged to secure several million poll plants as they are required. The policy followed as regards distribution is as follows:

Hawaiian plants are distributed in comparatively small lots, free of charge, the purpose being ultimately to provide seed plots in all the provinces. Native plants are furnished in small lots, free of charge; but when desired in commercial quantities, are furnished at ₱1.50 per thousand, which represents the approximate cost to the bureau. Seed beds for growing young poll plants until they are of suitable size for distribution have been started at the Singalong station in Manila and at the Lamao forest reservation on the west side of Manila Bay.

GENERAL FARM CROP SEEDS.

Experience has been highly satisfactory with broom corn, field corn, cowpeas, velvet beans, kaffir corn, sorghum, rice and sugar cane. Cotton, teosinte and new varieties of tobacco and peanuts have been sent out, but sufficient reports have not been received to justify definite conclusions. Barley and oats have been found to be useful as forage plants only at high altitudes. Alfalfas and clovers have done well at high altitudes, but have invariably died out in the lowlands, even where soils were inoculated with the specific nitrogen producing bacteria called for by each species.

GARDEN VEGETABLE SEEDS.

Unqualified success has been reported from every province except Samar with beans, beets, cabbages, carrots, eggplant, mustard, okra, peppers, radishes, parsley, New Zealand spinach, tomatoes, and turnips. The reports relative to sweet corn, American cucumbers, melons, watermelons and squashes, have ranged all the way from "very good" to "complete failure," the losses, except in the case of corn, being due to attacks of insect pests. Brussels sprouts, rhubarb, and French artichokes have proved very unsatisfactory. Asparagus has almost invariably flourished. Kohlrabi of excellent quality and size has been grown by the bureau experimentally and is deemed worthy of wide distribution. Celery has made a good growth, but has rusted when attempts were made to bleach it. American pease, if planted so as to mature during the cooler months, invariably fruit, but do not produce as abundantly as could be desired at low altitudes. In the highlands of Benguet they bear heavily. Some edible podded Japanese varieties raised experimentally have given heavy crops in the lowlands, and will be widely distributed.

ORNAMENTAL FLOWERING PLANT SEEDS.

Heretofore the bureau has not distributed seeds of this class, but latterly a small concession has been made to the constant demand for them, and amaranthus, balsam, calendula, caliopsis, cockscomb, mari-

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gold, portulacca, zinnia, nasturtium and ageratum seeds have been sent out in limited quantities. All but the last 2 species have given excellent results.

NEW DEVELOPMENTS IN SEED DISTRIBUTION.

Two noteworthy developments in seed distribution have been the greatly increased number of small farmers applying in person for seeds, and the largely augmented number of requests for seeds from the provinces of Samar and Leyte, which seems to indicate that the restoration of peace in these provinces is being followed by renewed interest in agricultural pursuits.

STEAM PLOWING.

In November, 1906, a large steam plow owned by the bureau was shipped to the Santa Rosa Friar estate, with a view to its use in plowing lands formerly cultivated in sugar but subsequently abandoned and covered with a dense growth of rank native grass and brush, so that it was almost impossible to break them up with ordinary farm animals and small native plows. The soils on which it was desired to use this plow were for the most part black in color, fine in texture, and very pasty when wet. The attempt was made to use a gang consisting of six 14-inch share plows of the sandy-land type, but, as was feared, it would not turn the black sticky soil. An 8-disk steam gang of the orthodox type was then tried. This worked fairly well in sandy land, which was comparatively free from grass and rubbish, but proved a failure in heavy soil which was badly overgrown. Two experimental gangs carrying 8 and 12 disks respectively, and each provided with a middle breaker were then constructed on special plans. The larger of these was designed to be pulled by a 35-horsepower engine, and the smaller by one of 18 horsepower. The latter gang proved to be too heavy until 2 of its disks were removed, after which it worked well. The heavier gang was a success from the start. Most of the dry season was consumed in these experiments, but they were necessary in order to devise a form of plow suited to the soil conditions encountered.

A number of other difficulties have been encountered in steam plowing for private persons. It was arranged that landowners should furnish labor, water, and fuel, the latter to be dry wood. The places where plowing has been done have usually been distant from houses, and laborers have been late in arriving. Animals for hauling wood and water have been scarce, and the available supply of dry wood has often been exhausted speedily. These facts serve to emphasize the necessity for more careful preliminary preparation by landowners who desire to have steam plowing done for them.

The manufacturers of a petroleum plowing engine, which, if successsful, would obviate fuel and water difficulties, and which is lighter and consequently more readily transported than any steam plowing engine, have offered to send one of their outfits on approval, the government to pay the cost of forwarding and returning the same in the event that it does not prove satisfactory. This offer will probably be accepted. Ten thousand pesos are available for continuing experiments in plowing with traction engines, and the use of other mechanical devices for cultivating the soil.

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ANIMAL INDUSTRY.

EFFORTS TO IMPROVE DOMESTIC ANIMALS.

The bureau of agriculture has continued to furnish a number of American stallions, jackasses, bulls, and boars to the provinces for breeding purposes. The results obtained have varied widely and have depended largely on the interest displayed by the persons having the animals in charge. In some instances, fine stallions have stood idle with hundreds of mares within easy reach of them. On the other hand, an Arab stallion in a remote mountain district has served 62 mares, and 2 stallions kept in direct charge of the bureau have served 75. Ten others have had a total of only 91 services. The groundless fear that native mares would be injured in foaling colts sired by larger horses has continued to exert a bad influence in spite of the demonstrated facts. Evil-disposed persons have circulated rumors that enormous stud fees would be charged, or that part of the colts sired would be taken in payment for the services of the stallions. The greatest difficulty encountered has been in the presence of numerous scrub native stallions, which got at mares soon after foaling, so that many of those brought in for service are found to be again with foal. In spite of all difficulties, a number of excellent colts have been reported. At present, the plan of fencing in pastures where mares can be brought before foaling and kept until after again got in foal, is being carried out with good results.

The demand for American and Australian bulls steadily increases, and the results obtained from those already sent out have been uniformly good. A fine lot of young bulls are now being raised and after being immunized to rinderpest will be distributed throughout the more important cattle breeding provinces.

An outbreak of hog cholera reduced the herd of Berkshire pigs to 6 sows, and temporarily checked their distribution. The herd is now being rapidly brought up again and distribution has been renewed.

The Angora and Maltese goats are flourishing, and the demand for these animals is greatly in excess of the supply.

RINDERPEST.

The energies of the division of animal industry have been largely directed toward holding in check this disease, which has appeared at one time or another during the year in the majority of the provinces. The policy at present pursued is to combat it at all points where it appears by the use of serum only. This practice has the advantage that it immediately checks the disease in any given locality, is not attended with any loss due to the inoculation, and even results in the cure of a very large percentage of the animals diseased at the time of inoculation. It is, of course, very popular with cattle owners. The drawback is that the immunity produced is of a temporary nature, and after two or three months animals which have received only serum inoculation become again susceptible to rinderpest, although if attacked they suffer less severely than do those which have not been immunized.

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The simultaneous method of inoculation in which blood from a diseased animal and serum are administered at the same time, confers permanent immunity, and can be effected with a very low percentage of loss, if the animals inoculated are not suffering from surra and are properly cared for while undergoing treatment. The neglect of owners who sometimes even leave them without drinking water while under treatment and the complications which have arisen through the occasional unsuspected presence of surra, have led to so many difficulties, that it has been deemed advisable to confine inoculations by this method to animals under treatment at regular quarantine stations except in special cases.

In repeated instances rinderpest has been introduced into provinces which had previously been entirely free from it, through the importation of diseased cattle. The need of an effective quarantine law which would give the bureau of agriculture power to penalize and prevent the shipping of animals suffering from dangerous communicable diseases has long been apparent, but as in the case of all sanitary measures, such a law could not be of practical value until the state of public sentiment justified its enactment. On October 10, 1907, it was believed that this time had come, and an act to prevent the introduction into the Philippine Islands of dangerous communicable animal diseases, to prevent the spread of such diseases within the islands, and for other puropses, was passed by the Commission.

Several especially valuable practical demonstrations of the value of inoculation by the simultaneous method have been afforded in the provinces, where animals thus immunized have remained well while nearly all others about them sickened and died. There is now a strong demand for the animals permanently immunized at the serum laboratory, and a private cattle dealer has recently announced his intention of establishing extensive yards and going into the business of permanently immunizing and selling cattle. The highly satisfactory results obtained in checking rinderpest in badly infected herds brought to Manila for slaughter, and in saving the animals already diseased, have been especially appreciated by the public, and it seems not too much to hope that serious popular opposition to cattle inoculation, due to ignorance or superstition, is now decidedly on the wane and that the most serious difficulties in the way of protecting the horned cattle of the Philippines from rinderpest have been overcome. At all events, the demand for serum has been greatly in excess of the available supply and more immunization work could therefore not have been done no matter how great the demand for it. Arrangements have now been made materially to increase the supply of serum, the unexpended balance of the Congressional Relief Fund having been made available for this purpose, and effective means of preventing infection by dust during the dry season have been devised, so that its keeping properties have been greatly improved and the danger of abscesses following inoculation seems to have been completely done away with.

HOG CHOLERA.

Hog cholera has been reported from nearly every province in the islands. It has not been practicable to pay much attention to this disease, as efforts to combat rinderpest have taken the almost exclusive attention of the small force of veterinarians available.

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GLANDERS.

Two thousand eight hundred and sixteen horses have been examined for glanders, of which 87 were found to be infected. This disease is prevalent throughout the islands, and owing to the widespread belief among the natives that it is incurable, little headway has been made in controlling it. Municipal authorities have as a rule been willing to do nothing more than temporarily quarantine infected animals; those which had the disease in acute form have died, while those in which it became chronic have been allowed to go at large and infect others.

SURRA.

Surra has been less prevalent than during the previous year. Nevertheless, there have been serious outbreaks in several provinces.

FOOT AND MOUTH DISEASE.

There has been no serious outbreak of this disease.

DISEASES OF FOWLS.

Diseases of domestic fowls have been reported from nearly every province. The principal ailments were chicken cholera and a parasitical affection of the skin of the head, which often results in total blindness and subsequent death. Many thousands of chickens and turkeys have died monthly in the provinces where this disease has been prevalent.

NEED OF VETERINARIANS.

The facts as to the prevalence of animal diseases serve strongly to emphasize the necessity for a greatly increased force of veterinarians in these islands, and it is believed by the undersigned that this need may best be met by providing for the education of Filipinos in this most important branch of medical science.

CATTLE INSPECTION AT MANILA.

A full account of the extensive cattle inspection operations carried on at Manila, and of their results, will be found in the annual report of the director of agriculture, "Appendix F."

SERUM HERD.

The management of the serum herd was turned over to the bureau of agriculture on January 1, 1907. It was hoped that this herd could be transferred to the Alabang stock farm before the end of the year, but delay in the erection of necessary buildings made this impossible. At the time the herd was transferred it included 60 serum bullocks. This number has been increased to 107, and it is still impossible to supply the demand for serum.

ALABANG STOCK FARM.

A new stock farm has been established on the Muntinlupa Friar estate, 22 kilometers south of Manila, on the west shore of the Laguna de Bay. It can now be reached only by lake steamer, but

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the grade for the new Batangas line of railway which passes just in front of the farm is being rapidly completed, and communication by train will soon be established. This will greatly facilitate the shipment of milk to the government hospitals at Manila.

This new stock farm contains 240 hectares of land, all of which is available for cultivation or pasture. Conditions as to soil and water supply are most satisfactory. Five wooden buildings have already been erected, and a dairy barn for 50 milk cows, sheds for 150 serum bullocks, a quarantine station, and a superintendent's house, a shed for Maltese goats, an implement shed, and quarters for laborers, will be erected at the close of the rainy season.

There are now at the farm 122 head of cattle, 20 head of horses, 26 Maltese goats, and a herd of Berkshire pigs. The Maltese goats were imported during the year. Elaborate precautions, which resulted in complete success, were taken to avoid the introduction of Malta fever. Four males and 14 females arrived in good condition at Manila. Five died shortly after their transfer to Alabang, from eating a poisonous vine. The remaining ones have flourished, and at the end of six months after arrival the herd numbered 28, in spite of the early loss of 5 breeding animals. Some of the best goats give 5 to 8 pints of milk per day, and it is hoped that their introduction may ultimately lead to a material relief of the existing shortage in the supply of fresh milk.

GENERAL CONDITION OF STOCK AT ALABANG.

All the stock at the Alabang farm has kept in excellent condition, although taken there during the dry season and fed very little grain. The calves dropped on this farm are the best ever raised by the Bureau.

TRINIDAD STOCK FARM.

This farm, in the highlands of Benguet, was opened during the closing months of the last fiscal year. It has fairly good soil, is provided with adequate buildings, and has a fairly good water supply. Some of the pasture land is rough and a certain amount of fencing is necessary to insure against danger that animals will injure themselves by falling. Of the 400 hectares of grassland connected with this farm, probably 25 per cent are inaccessible to large domestic animals. The pasture is poor on the hills during the dry season, and the animals at present on the farm have taxed it. Additional land in the neighboring Trinidad Valley will soon be fenced. This land is too wet for use during the rainy season but will be very valuable during the drier months.

STOCK ON HAND AT THE TRINIDAD FARM.

At this farm there are 2 imported stallions, 14 imported mares, 20 native mares, 5 yearling colts, 9 suckling colts, 6 jack burros, 11 jennets, 3 imported bulls, 3 grade bulls, 1 imported cow, 47 native cows, 6 grade steers, 23 grade heifer calves, 17 bullocks, 1 Berkshire boar, 2 grade boars, 1 grade sow, 4 Angora goats, and 8 sheep, making a total of 185 animals. The remarkable freedom from disease enjoyed by the animals on this farm has caused it to be used for carrying on experiments in horsebreeding, and as a safe plan for keeping animals likely ultimately to be required for breeding purposes in the lowlands.

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The results of the breeding operations carried on at this place will be found fully set forth in the report of the director of agriculture, "Appendix F." A question of immediate importance which suggests itself in connection with the Trinidad farm is the improvement of the pasture land, and the raising of forage crops. Teosinte does not do well at this altitude. Oats when sown on well-manured land produce a heavy growth of green fodder, but ripen very little seed. Bermuda grass is now growing in many parts of the Trinidad Valley and is readily transplanted. It keeps green during the dry season when most other grasses wither. Plats of it will be started at various points on the farm.

Guinea grass raised from roots sent from Manila is flourishing. At Manila it produces numerous very heavy successive crops of excellent green forage, and should it do equally well in the Trinidad Valley could be grown on the moist lands during the dry season, and might furnish an adequate solution for the forage difficulty at this time. Clover grows luxuriantly under irrigation.

FARMS ABANDONED.

The stock farm at San Juan del Monte was abandoned in favor of the new one at Alabang, where conditions are much more favorable.

A small rice farm of 25 hectares on the Santa Cruz Friar estate was also abandoned. The land had been broken by plows hauled by a petroleum traction engine and an 18 horsepower steam traction engine, both of which the bureau was testing, and the rice was threshed with an ordinary rice thresher. The operation of this machinery was interfered with by people whose superstition had in some way been aroused by unscrupulous persons. As the sole object of establishing this farm was to afford a demonstration of the advantages of steam plowing and threshing, there seemed no reason for continuing it.

MACHINERY INVESTIGATION.

The hemp-cleaning machine invented by Mr. Welborn, the former director of the bureau, has been considerably improved and enlarged. One of the perfected machines has been sent to the provinces, and 10 more have been contracted for. Unfortunately, the first machine to go into the field was placed in the hands of incompetent persons, who apparently made very little effort to keep it clean or in adjustment. It proves to have a capacity of some 450 pounds of dry fiber per day of eight hours, when operated and supplied with petioles by inexperienced men. The undersigned saw this machine in operation. The fiber delivered by it was not well cleaned, the obvious reason being that the cleaning knives were badly out of adjustment. The capacity of this machine in the hands of competent persons yet remains to be determined.

Some efforts on the part of the bureau of agriculture to perfect machinery for ginning kapok have not led to any important results. Meanwhile, a local firm has introduced a cotton gin modified so as to adapt it to cleaning kapok, which delivers 1,500 pounds of well-cleaned fiber per day, and requires eight horsepower for its operation.

Three makes of cylinder rice hullers and polishers have been tried, but the results have not been satisfactory. The conclusion has been reached that burr hullers are better adapted to present conditions in the Philippines than are the more modern cylinder hullers.

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The bureau has continued its effort to meet the great need in these islands of a maguey cleaning machine of small weight and comparatively low cost, and has at last obtained success. The so-called "Pioneer" machine was imported from the United States. As received, it proved highly unsatisfactory, but certain modifications were introduced, which have given it a capacity of 10,000 to 12,000 leaves per day. It cleans the fiber thoroughly, and saves a large percentage of it.

DIVISION OF PLANT INDUSTRY.

The work of this division includes all general plant investigations, laboratory and field tests of seeds, and the work of plant introduction and improvement carried on at the Singalong experiment station at Manila, the Lamao forest reserve in Bataan Province, the La Trinidad farm at Baguio, Benguet, the sugar farm at La Carlota, Occidental Negros, and the coffee farm at Lipa, Batangas.

The results of this work are fully set forth in the report of the director of agriculture, "Appendix F," and only the most important can be referred to here.

GROWING ABACA FROM SEED.

There has been much difference of opinion as to whether abaca could be successfully and profitably grown from seed for starting new plantations. The bureau of agriculture has been able to answer this question in the affirmative, and has grown seedling plants averaging 3 feet 6 inches in height in six to seven and one-half months. These results were obtained at Manila under very unfavorable soil and climatic conditions.

KAPOK.

Attention has been called in previous reports to the unfortunate waste of this valuable fiber in the Philippines, where the people were ignorant of its value. The bureau has successfully continued its efforts to educate the people on this point, and to secure a market for the product. Planting is now progressing on a considerable scale.

EXPERIMENTS IN SEED PRESERVATION.

Great difficulty has heretofore been encountered in preserving seeds, which lose their vitality with extraordinary rapidity during the rainy season, and experiments have been conducted with a view to remedying this difficulty. Great success has been obtained by placing seeds in a jar on top of a layer of coarsely broken and thoroughly dried charcoal, covering them with a second layer of charcoal, gently heating the jar to expel all remaining moisture, and then carefully sealing it. A jar thus closed on December 23, 1906, was opened on May 23, 1907, and of 100 seeds taken at random 91 germinated. From a jar that had been merely hermetically sealed at the same time only 28 per cent germinated.

GUINEA GRASS.

Twenty roots of this grass from Honolulu which arrived in good condition, were propagated by the division and have grown very successfully. Half a hectare is now planted with it at Singalong, and many plants have been shipped to the provinces. It gives a very

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heavy yield of tender succulent forage which is greedily eaten by horses and cattle. Three cuttings have been made from the original plants with no symptoms of exhaustion.

A NEW PHILIPPINE VELVET BEAN.

The successful introduction of the Florida velvet bean has previously been reported. Subsequently, an undescribed species of native velvet bean, to which the name "Macuna lyoni" has now been assigned, was discovered in the province of Pampanga. Three seeds were obtained which weighed 2 grams, and from then $7\frac{4}{10}$ kilograms of seed were grown, the 3 plants being stimulated in every way to a maximum production. Subsequent field tests alongside the Florida velvet bean show that the Philippine species is the more productive. It has now been grown to the third generation, is losing the woodiness of its main stem, and continues very prolific. It has the advantage over the Florida velvet bean that its fruit is palatable for human beings. Samples of the seed have been furnished the bureau of plant industry of the United States Department of Agriculture for field tests in the Southern States. This is a soil-renovating plant and its discovery is a matter of no little importance.

CAROLINA GOLDEN RICE.

This rice sown in drills 18 inches apart and cultivated much like corn, with no artificial irrigation, headed in ninety days, was harvested in one hundred and twenty days, and yielded on thin sandy land 52 cavans to the hectare—a most satisfactory result.

TANIAS.

One bulb of this fine variety of "Taro" obtained three years ago from Porto Rico has proved very prolific, and furnished sufficient seed to permit the planting of 150 linear meters. A considerable public distribution can therefore be made next season. It produces a good crop with less water than the varieties previously grown here under the name of gabi, and promises to be a valuable addition to the list of vegetable foods which can be grown without irrigation.

VANILLA.

Vanilla plants received as exchanges a year ago were planted at the Singalong experiment station, and some of them have made leaders 3 meters long. Experiments in growing vanilla will be continued at Sablan, in Benguet.

COFFEE.

A small plantation of hybrid maragogype coffee at Lipa, Batangas, produced its first crop of a little more than 1 pound of berries to the bush. The immunity displayed by this variety to leaf blight was so great that the berries were all quickly bespoken by old coffee planters for seed. A few trees at the Singalong station, under most unfavorable soil and climatic conditions, are nevertheless yielding heavily.

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RUBBER.

Cuttings of a rubber vine, Parameria, found wild in Mindoro have been brought to Manila and successfully rooted and grown at Singalong. Laboratory analysis shows that 4.52 per cent of the dry bark and 1.48 per cent of the live weight of the plant are pure caoutchouc. The vine is too small to be successfully tapped, and commercial extraction processes must be found before it will be of great value. Small plots produced at the rate of 4 tons per acre, giving a theoretical yield of 120 pounds of rubber to the acre. The time required to secure a crop after the planting of cuttings remains to be determined.

IMPORTANT EXPERIMENTS AT TRINIDAD STATION.

Important experiments in plant hybridization and improvement are being carried on by Mr. Gustav J. Petrelli at this station. Considerable improvement has already been produced in a species of wild raspberry. California oranges and lemons have been successfully grafted on native citrus trees, and promise excellent results. Wild blueberries have been improved greatly in size and flavor, and the bearing period has been much prolonged. A hybrid tomato, which shows considerable power to resist excessive rainfall, has been produced by crossing a native and an imported variety.

By a system of root grafting and training young mulberry trees have been made to produce fruit within a few months, and the berries have been materially improved in quality. Irish potatoes of good size and excellent quality have been raised. Nearly all the standard varieties of temperate zone and tropical vegetables have been successfully produced. Strawberries have been grown in considerable abundance.

A full account of the work carried on at this station and at the Lamao and La Carlota stations will be found in the report of the director of agriculture, which is appended and marked "Appendix F."

THE WEATHER BUREAU.

The work of the weather bureau has been maintained at its usual high efficiency, and, as usual, there is little connected with it to which it seems necessary to call especial attention in an annual report.

IMPORTANCE OF WEATHER SERVICE.

The importance of maintaining an adequate weather service in countries liable to be swept by typhoons was demonstrated in a most striking manner by the terrible consequences attendant upon the failure of the observer in the neighboring colony of Hongkong seasonably to warn the shipping in the harbor of the approach of the typhoon of September 18, 1906. The danger signal was given only twenty minutes before the storm struck the harbor, and in consequence dreadful loss of human life and enormous damage to vessels resulted. Such a thing would have been impossible at Manila, where the public is kept constantly informed of the whereabouts of all typhoons in or near the Archipelago. The efficiency of this service is such that the correctness of typhoon warnings is assumed by everyone.

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TIME SAVED IN ISSUING TYPHOON WARNINGS.

In order to save all possible time in issuing warnings of dangerous storms, the observatory has been provided with a direct wire to police headquarters, so that they can be transmitted by telephone, and as all police officers call up the central office at least once an hour, it takes but a short time to inform every policeman on duty in the city of the approach of a dangerous storm, so that he may spread the news along his beat. Persons who would not see the storm signals are thus warned in time to enable them to take the necessary precautions to save their property.

SPECIAL TYPHOON WARNINGS TO NEIGHBORING COUNTRIES.

Besides the very numerous storm warnings sent to the different parts of the Archipelago, 28 special typhoon warnings were sent to neighboring foreign countries during the year.

SEISMIC OBSERVATIONS.

By means of delicate instruments, 126 earthquakes have been recorded in the islands during the year. Ten of these were felt at Manila. Only 2 of the entire number were of any considerable force; that of April 19, which was strong at Manila and somewhat destructive in the Camarines provinces; and that of May 25, which was felt quite strongly in north Ilocos.

Two horizontal pendulums of the Bosch-Omori type were made by the observatory mechanics and installed during the year. They have given extraordinarily good results in recording distant earthquakes. The records made by them have in this respect been more satisfactory than those made by the Vicentini microseismograph. Among them may be mentioned that of the Valparaiso earthquake on August 16; that of the Sumatran earthquake on January 4, and that of the Mexican earthquake about the middle of April.

It is a strange fact that the record or seismogram of the Valparaiso earthquake taken in Manila is probably the only complete seismogram of this earthquake in existence. A copy of it was sent by request to the secretary of foreign affairs of Chile, and the original was requested by a cable by the international committee of seismology, for insertion in its report and for presentation to the International Congress of Seismology to be held in Rome in September, 1907.

MAGNETIC DEPARTMENT.

The work of the magnetic department remains at a standstill, on account of the disastrous effect of the electric current used in operating the street railway system of Manila.

IMPROVEMENTS.

Many improvements have been made at the central observatory, including the installation of wireless telegraphic instruments.

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CHANGES IN WEATHER STATIONS.

There have been some minor changes in the stations in operation, the present total being 7 first-class, 9 second-class, 26 third-class, and 10 rain stations, which are supplemented by 5 stations conducted by volunteer observers

NEW WORK.

The bureau now prepares a daily weather map showing the weather conditions at 6 a. m. in the Philippines and in the whole Far East. This map is ready for distribution about noon. The bureau is also issuing a monthly summary of the meteorological elements for Manila, which appears promptly at the close of the month and is given to the public through the medium of the daily press. It is purposed to supplement this form with another, which will give at the end of each month the normal or average values of the various meteorological elements for the coming month, as deduced from many years' observations. Thus, on the 2d or 3d day of each month the public will be informed what were the actual conditions during the month just passed; and on the last day of each month will learn what conditions it may reasonably expect during the month to come.

Owing to the importance which the seismographic work is assuming, and to the demand for records of seismograms, provision has been made to issue monthly a short seismic bulletin for exchange with the most important geodynamic observatories of the world. This bulletin will be, in reality, an advance sheet of the regular monthly bulletin, but will be sent out without delay.

RECEIPTS AND DISBURSEMENTS OF BUREAUS.

Statement of the receipts and disbursements of the several bureaus of the department of the interior will be found in the annual reports of their respective chiefs, which are appended hereto.

Respectfully submitted.

DEAN C. WORCESTER,
Secretary of the Interior.

To the PHILIPPINE COMMISSION,
Manila, P. I.

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APPENDIX A.

REPORT OF THE DIRECTOR OF HEALTH.

DEPARTMENT OF THE INTERIOR,
BUREAU OF HEALTH,
Manila, P. I., August 5, 1907.

SIR: Pursuant to instructions issued by the honorable the secretary of the interior for the Philippine Islands, I have the honor to submit herewith the following report upon the operations of the bureau of health for the period from July 1, 1906, to June 30, 1907, this being a complete report of the health work in the islands for the year ended June 30, 1907, and the eighth annual report of this division of the Philippine government.

ALL RECORDS BROKEN.

The effect of the sanitary reforms which have been persistently carried out during the past few years commenced to show in a most concrete and substantial manner during the period covered by this report. The public health has been more satisfactory than at any time since the American occupation of the Philippines, from which it is reasonable to infer that health conditions are better now than at any time for the past one hundred years or more. The death rate per thousand for the city of Manila has been reduced from 40.99 last year to 36.91, the rate for Americans being 5.59, which is a reduction of 3.75 over the previous year, and among Spaniards the rate dropped from 17.40 to 15.84.

There has not been a single case of plague in the islands and not one death from smallpox in the city of Manila. Cholera in recognizable form has disappeared entirely from the archipelago. The provinces of Cavite, Batangas, Cebu, Rizal, Laguna, Bataan, and La Union, where heretofore there have been approximately 6,000 deaths annually from smallpox, have not reported one death from this disease. In all there have been over 2,000,000 vaccinations performed, the direct effect of which was that many lives were spared and thousands of persons were saved from being disfigured for life, and at the few places at which smallpox did break out it made no headway.

The solution of the leprosy problem has passed from the theoretical to the practical stage. The number of lepers September 1, 1905, was 3,580; the number June 30, 1907, is 2,826.

Great strides were made in introducing better drinking water, artesian wells being now in actual use in many of the towns of the provinces.

More detailed information about all these matters will be found under appropriate subheads in the pages which follow.

THE NEW CENSUS OF THE CITY OF MANILA.

During the month of January the bureau of health took a census of Manila, which showed the population of the city to be 223,542, as against 219,941 given by the official United States census of 1903, which is an increase of 3,601, or 16.37 per thousand. The increase by nationalities is as follows:

Americans	810, or 18 per cent.
Filipinos	5,510, or 2 per cent.
Spaniards	375, or 14 per cent.
All other nationalities	248, or 27 per cent.

There has been a decrease in the Chinese population from 21,230 to 18,028, or 15 per cent; and among those classified as "Other Europeans" there has been a reduction from 1,117 to 977, or 12 per cent.

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The decrease in the number of Chinese can probably be accounted for by—

1. The large emigration to the provinces which has taken place among the people of this nationality as peace conditions in the outlying districts have become more and more secure.

2. The operation of the Chinese exclusion law, which prohibits the immigration of this nationality to the Philippines, and thus prevents the balancing of the losses caused by the mortality.

3. The few births, owing to the small number of the wives of Chinamen living in Manila.

4. The return of many to China to spend the remainder of their lives.

5. The census being taken at a time when a great many Chinamen were visiting their native country to celebrate the Chinese New Year.

The acting secretary of the interior approved the use of the figures of the census taken by the bureau of health, and the same will be used hereafter in compiling all vital statistics.

The census was taken at a time when a considerable portion of the population was absent in the provinces, and no doubt many others remained uncounted, owing to the suspicion with which the more ignorant residents view government officials, they being extremely suspicious that there is some ulterior motive in view, so that the real population is probably much higher than the foregoing figures show.

One fact clearly shown was that the sanitary officials are constantly coming into closer touch with the people, and are no longer always viewed as enemies. The double function that many of the sanitary inspectors now perform, of reporting communicable diseases and insanitary conditions and of providing the indigent with free medicines and having them cared for in charitable institutions, has no doubt had much to do with this more favorable condition of affairs.

CHOLERA.

At the time the last annual report was about to be sent to press the bureau was again busily engaged in combating a cholera outbreak, which threatened to assume serious proportions. In the city of Manila there occurred during the year 848 cases with 744 deaths, and in the provinces 7,085 cases with 5,243 deaths.

The disease commenced to spread by land, both north and south, and it was only through the magnificent fight to eradicate the disease from Tayabas, made by a detail of bureau of health officials, that another serious outbreak like that of 1902 was avoided. The cholera spread slowly from the province of Laguna along the new road which leads from Bay to Lucena by way of Tiaong. The onward march of the disease was stubbornly resisted, and it was only after all effort was concentrated on the narrow neck of land in Tayabas province which lies between Laguimanoc on the west coast (China Sea) and Atimonan on the east coast (Pacific Ocean) that its onward march was finally arrested. It is noteworthy that at no time did the disease spread by sea, thus showing conclusively that the marine quarantine measures were entirely effective.

The measures adopted in combating cholera were practically the same as those given in the last annual report—strict outgoing maritime quarantine; prompt isolation of the sick and disinfection of the premises, and no attempt at quarantine by land.

It is hardly possible to describe the feeling of security which seemed to pervade the public. With the exception of the comparatively small increase in the freight and passenger rates that was imposed upon interisland vessels leaving Manila, no large financial loss resulted. The regular machinery of the bureau of health worked so smoothly that it was able to meet all demands with practically no increased outlay above routine expenditures. If it had not been for the reports which were published daily, the people would scarcely have known that cholera was in their midst, except in so far as they or their friends were directly affected by the disease. The feeling of security was directly responsible for the preservation of many lives, and on account of there having been practically no disturbance to business thousands of dollars were saved.

A detailed report of the cholera for this period will appear later in a medical journal.

PLAGUE.

Since the method of combating plague has been based upon the theory that its eradication could be accomplished by isolating the sick and destroying plague-infected rats, the efforts of the bureau have met with complete success. There has not been a case of plague in the Philippine Islands during the period covered by this report, except those which were accidentally caused by inoculations in Bilibid on November 16, 1906, while prophylactic inoculations against cholera were being made by a mem-

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ber of the staff of the bureau of science. In all there were 24 cases due to this latter cause, 14 of which died, giving a case mortality of 58 per cent. The fact that the cases occurred in a crowded institution, with an average of about 3,500 inmates, and that the disease was confined strictly to the inoculated cases, is further convincing evidence of what may be accomplished by modern sanitary science.

Manila and, in fact, the entire Philippine Islands present a plague record which stands in favorable contrast with that of the rest of the Orient. In India about one person out of every 300, or over one million persons annually, are dying of plague. In Hongkong, Amoy, Singapore, Saigon, and other oriental cities having commercial intercourse with Manila many cases are being constantly reported. Doctor Atkinson, the honorable principal civil medical officer of Hongkong, in an address before the Philippine Islands Medical Association at its last session, held in Manila February 27, 28, March 1 and 2, 1907, said:

"It is an almost hopeless task to expect to stamp out plague entirely in Hongkong, seeing how liable we are from our geographical position to reinfection from the neighboring countries. Many insanitary areas and buildings have been allowed to be erected, and it is only by their erection on improved plans and by rigid prevention of overcrowding that plague or any other infectious disease can be stamped out of Hongkong."

The Philippines have been more fortunate, but, of course, are subject to reinfection on account of their geographical position and extensive and increasing commerce. A continued immunity from the disease can be had only through the greatest precautions being taken with vessels from plague-infected ports, and by placing the ports of entry in such good sanitary condition that even if the disease should be imported its eradication could be accomplished easily. This means, so far as Manila is concerned, at least, that the work of improving insanitary areas and of removing or repairing insanitary structures, which was begun several years ago, must be pushed steadily until the last place of that kind has been eliminated.

BERI-BERI.

The mortality from beri-beri in Manila at large was about the same as for last year, there being 403 deaths reported from this cause, as against 378 for the previous year. One death occurred among every 391 Chinese and one death among every 540 Filipinos. No deaths took place among Americans or Europeans.

In public institutions there has been a most marked reduction in the deaths from this disease. At Bilibid, for instance, the number dropped from 21 for last year to 9 for this year. Less and less difficulty is being experienced in preventing the spread of beri-beri in jails and other places where the inmates are under the direct control of the bureau. Practically the only cases with which it was necessary to deal were in those persons who were afflicted with the disease upon admission.

Upon the appearance of beri-beri the nitrogenous constituent of the ration is immediately increased by adding more meat and mongos (small beans), and the amount of rice is correspondingly reduced. In view of the remarkable results recently achieved by Fletcher at the Kuala Lumpur Lunatic Asylum, Straits Settlements, in using a rice which was boiled before being husked, no cases of beri-beri occurring among 123 inmates in the same institution who were kept on this diet, while 43 cases with 18 deaths occurred among a similar number who ate rice which was unboiled before being husked, it may perhaps be that the success which has been had in the Philippines in the management of this disease has been largely due to the withdrawal of a portion of the rice.

The impression has also been gained during the past year that beri-beri is very much less common among persons who eat only Philippine rice which is not husked until shortly before using, owing to the mold which soon renders it unfit for consumption, than among persons who use imported Chinese or Indian rice, which has often been husked for a year or more before being used. However, no systematic observations have been made upon this point, and investigation may prove it to be fallacious. At any rate, the fact that no Europeans or Americans, whose diet is richly nitrogenous as compared with the native Oriental, succumbed certainly indicates that the question of diet as a cause of beri-beri deserves further observation and study.

TUBERCULOSIS.

A large part of each annual report of the bureau of health since American occupation has been devoted to the discussion of cholera, plague, and smallpox, and when the term "dangerous communicable diseases" has been mentioned it was usually in

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connection with these maladies. Nearly every general appropriation bill that has been passed has provided funds for combating these diseases. Dangerous and formidable as they are, they are insignificant when compared to the great white plague, tuberculosis, which is the most universal scourge of the human race, about one-seventh of all of the deaths of the world being caused directly by it. During the past year in Manila one-sixth of the total deaths were actually due to this cause. This does not represent the total number of cases, as many persons who have tuberculosis die with intercurrent diseases. Tuberculosis claims more victims, produces more misery, is destructive of more happiness, creates more poverty, and interferes with the public weal to a greater extent than any other disease ever known to man. These facts are appalling, when it is remembered that the disease is preventable, though with greater difficulty than cholera, plague, or smallpox. The disease is largely propagated by unnatural conditions created by the victim or his friends. Environment is an important predisposing factor in the spread of tuberculosis, as proved by the susceptibility of those who live in dark, damp, and poorly ventilated habitations; such persons not only manifest a greater liability to contract the infection, but show a decidedly lower resistive power against its progress.

Every place where people collect in crowds for work or pleasure becomes a danger center. Living in unwholesome lodgings which are damp and dark, ill ventilated, or overheated is one of the chief predisposing causes of tuberculosis. Experience has shown that tuberculosis is preeminently a house disease—a disease of indoor life. Doctor Flick, the noted Philadelphia physician, has truthfully said:

"Without the house tuberculosis would not exist. It depends upon the house for its implantation and propagation and for the evolution of all its phenomena. The house is the place where the *tubercle bacillus* lies dormant in wait for its new host; it is the place where the new host gets his implantation; it is the place where the tubercular subject gradually becomes a consumptive, and it is the place where the consumptive dies.

"If man desires to free himself from the great white plague, he will have to retrace his steps from some of what he considers advanced points of civilization. He will have to learn among other things that fresh air is God's greatest gift on earth, and that whatever shuts out fresh air shuts out health and happiness."

The disease in the Philippine Islands, as elsewhere, is more prevalent in the cities than in the country districts, particularly in the larger cities, such as Manila, where the population is massed together. Its progress is greatly facilitated by insanitary conditions, especially those which favor the presence of bacilli in the atmosphere, and the reduction of individual powers of resistance.

Anything which has a tendency to impair the general health may serve as a contributory cause, but the essential cause is the *tubercle bacillus*, and without this bacillus there can be no tuberculosis. There are three methods by which germs probably gain access to the body—by inhalation, that is by breathing into the lungs; by ingestion, or by being swallowed with food, drink, or saliva; and by inoculation, or by the penetration of tuberculous substances through a wound in the skin.

The most frequent method of propagation is that resulting from the indiscriminate deposit of tuberculous sputum through careless expectoration. If sputum is carelessly deposited so that it becomes dry and pulverized, the action of the air soon causes it to mingle with the dust and the person inhaling the atmosphere thus contaminated is exposed to the danger of contracting the disease. Besides the danger arising from carelessly deposited sputum, the inhalation and ingestion of small particles of saliva expelled by a patient during the act of coughing, especially when the cough is dry, or expelled when he is speaking quickly or loudly, or when sneezing, is a source of danger to all who come in close contact with him. During these acts there are expelled almost invisible drops of saliva, so small that their impact against the skin are not recognized by the nerves of sensation, yet they may contain *tubercle bacilli* and be the means of spreading the disease.

The next most frequent method of propagation, and one to be reckoned with seriously in Manila, is through the ingestion of the germs of the disease with food and water which may become contaminated by dust, by contact with flies or insects, by careless handling, or by careless spitting. The third and much less frequent cause of tuberculosis, the inoculation or penetration of the tubercular substance through the skin, is by no means rare in the Philippine Islands.

The bureau of health has issued a bulletin setting forth all these methods of conveying the disease, and urging appropriate prophylactic measures. Attention has been called to the fact that the expectorations of a patient suffering from pulmonary tuberculosis, no matter what the stage of the disease is, may spread the infection if the matter expectorated is not rendered harmless before it becomes dry and pulverized.

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It is being urged that all tubercular patients should make use of spit cups made of metal, in which some disinfecting fluid should be kept, in order that the sputum may be disinfected and thereby rendered harmless. An effort is being made to have provided in schools, churches, factories, stores, railway cars, waiting rooms, restaurants, saloons, theaters, and other places where people congregate an ample supply of sanitary cuspidors. The use of the pocket handkerchief as a receptacle for sputum is dangerous.

The bulletin on tuberculosis discusses the symptoms and signs of the disease and urges the importance of an early diagnosis, especial stress being placed upon the importance of prevention, and teaches that tuberculosis may be prevented by proper precautions. The sputum is the greatest source of infection and should receive the greatest care. These precautions referred to consist of destroying the sputum of infected persons before it has time to dry; of admitting plenty of fresh air and sunlight to all living rooms; of avoiding the raising of clouds of dust by sweeping or otherwise; of keeping the general health of the noninfected at the highest standard; of eating wholesome food; of systematic bathing, which should include the sponging of the chest; and of observance of the strictest rules of personal hygiene—in other words, "living as close to nature as possible." Floors should always be dampened or sprinkled with wet sawdust or damp sand before being swept.

The same rules of personal hygiene with appropriate medical treatment will cure the majority of cases, if taken in time. The greatest mistake that can be made with reference to the disease, except the use of advertised or quack remedies or "consumption cures," is to deny its presence or to delay treatment by proper measures.

In the profession of medicine there are no secret remedies or methods; such belong exclusively to the quacks and should be avoided as worthless, dangerous, and unscientific.

Sanitariums, hospitals, dispensaries, care stations, and special facilities for public notification are called by Professor Koch the heavy artillery in the battle against tuberculosis, while he designates all efforts to instruct the people as to the danger of tuberculosis, to arouse by proper publications the interest of the masses in combating the disease, and all other means, as the lighter weapons. In some battles the heavy artillery proves more effective than the lighter weapons, while in others the credit must be given to the latter.

The time will soon come when State and municipal governments will take the initiative in the great work of prophylaxis. The expense involved is too great for private resources to bear. The first step will be compulsory notification; then will follow measures for protecting the public by taking adequate precautionary means, properly supported by legal authority, against the spread of the disease by the filthy habit of indiscriminate spitting; the betterment of domiciliary conditions, especially with reference to ventilation; and, finally, the enlightenment of the patient himself.

Koch's five measures for combating the disease are substantially as follows:

First. "Compulsory notification of all cases of infection or open cases of tuberculosis to the board of health."

Second. "Hospital for advanced cases."

Third. "Sanitariums for incipient cases for the purpose of a practical education in the cure and the prevention of the disease; also instructions to medical men and students in the means of making a diagnosis at a time when most cases can be cured."

Fourth. "The establishment of free dispensaries for the poor and provisions for furnishing such patients with food, raiment, medicine, and proper sanitary environments in their homes, and proper instruction in nursing by persons who are trained in sanitary methods and in the use of sanitary appliances."

Fifth. "Sanitary homes and workshops, and by educational campaign through the press, lectures, and leaflets, giving concise description of the disease, its causes, and the best method of cure and prevention."

If the sputum question could be settled definitely in favor of hygienic precautions, the disease would very soon be eliminated from the Philippine Islands. In the city of Manila the sanitary code makes provision against spitting on the sidewalks and in public places. This is a step in the right direction, but the great trouble lies in the lack of knowledge and appreciation of the people of the true nature of the disease. Where one case is contracted on the street, perhaps a thousand are contracted in houses, so that after all the campaign resolves itself into one of education, not of law. The work has already been inaugurated. The results are slow to manifest themselves, but are sure to come if the present policy is continued with patience, perseverance, and energy. The contents of the bulletin on tuberculosis which was prepared by the bureau of health during the year are now being taught in the schools of the Philippine Islands, and it is hoped that this campaign of education which has been thus begun will be

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the forerunner of a movement which will result at least in greatly reducing the number of cases of tuberculosis in the future.

DIPHTHERIA.

Heretofore the only cases of diphtheria which came officially to the knowledge of the bureau of health were those which arrived upon incoming vessels, most of them occurring upon navy ships. During the past year, however, several cases have been reported in different portions of the islands, the diagnosis of some of them being confirmed microscopically.

Several cases occurred in Catbalogan, Samar, which presented all the clinical appearances of diphtheria, but the diagnosis was not confirmed bacteriologically.

One case occurred in the city of Manila, in an American child who had been resident here for more than a year previous and, so far as is known, had not come in contact with anyone who had diphtheria. The disease developed several days after Christmas presents were received from St. Louis. Whether the infection had been conveyed by the presents or in the packing with which they were surrounded is, of course, not known.

During the latter part of May, 3 cases occurred in a Filipino family, the members of which had been residents of Manila for many years, and the parents are very positive in their statements that none of their children had come in contact with any person from incoming ships for at least several weeks previous to the appearance of the disease. In this family there were 3 cases and 2 deaths. In all, there were 10 cases with 8 deaths reported for the year. Recovery took place in the 2 cases in which antidiphtheritic serum was used.

YAWS.

During January and February a number of cases of yaws were reported in Parañaque, a small town situated on the Bay of Manila just outside the city limits. No deaths are known to have occurred. On March 1, a case of yaws occurred among the lepers at the San Lazaro Leper Hospital; seven days later 3 additional cases were reported, and in the succeeding fourteen days there were 2 more, the last case having been reported May 12, making a total of 7 cases in all. No fatalities occurred among them. Microscopical examinations made of the specimens taken from the lesions showed a spirochæte similar to the one described by Castellani to be present.

TYPHOID FEVER.

Typhoid fever seems to have obtained a firmer foothold in the Philippines than has heretofore been the case. As the changes which ordinarily accompany the introduction of advanced civilization are being more and more introduced in these islands, it is becoming apparent to a greater degree that this disease is constantly affecting more persons. At the present time the construction of the new railroads in the islands is responsible for the gradual introduction of typhoid at many places at which it has not been encountered heretofore. Fortunately many of the cases appear to be due to direct importation, the disease appearing among Americans and Japanese who have only recently come to the country; the patients either arrive during the incubation period or, possibly, have ingested foods obtained in countries from which these new arrivals came. It would also appear probable, in view of Soper's recent investigations in New York, that there are individuals arriving here who have infected gallbladders or who at least excrete typhoid organisms in their stools. It seems logical that the reasons why typhoid has not spread more heretofore in the Philippines are not so much on account of the tropical climate, but because the ordinary vehicles by which the disease spreads have not been present. For instance, it is only a few years since milk of local production has been used to any extent in the islands; there were practically no general water distributing systems or reservoirs; in the absence of sewer systems, it was almost impossible to infect places in which oyster and other shellfish grow. These facts, together with the comparative absence of flies during the greater portion of the year, are all explanations as to why there has not been heretofore a more general spread of the disease.

Every effort was made to trace the origin of the infection in the cases that occurred in the city of Manila. A medical officer was detailed for this purpose, who spent several weeks upon the investigation, but no definite conclusions were reached.

It has been the opinion of the bureau of health that if the Mariquina River, from which the water supply of the city of Manila is drawn, should become infected with typhoid fever, a wide-spread epidemic would occur in the city of Manila, and from there the disease would very probably be carried all over the Philippine Islands. For

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this reason extra precautions have been taken in order that the bureau might keep well informed as to whether any cases of typhoid were occurring among residents who lived on the watershed. So far not a single case has been found, and it is probably due to this fact that Manila has enjoyed a comparative immunity from this disease. There were reported in all in the city of Manila 58 deaths from typhoid fever during the year, but of this number the diagnoses of not more than 8 or 10 were verified by laboratory methods.

GANGOSA.

The first person in the Philippine Islands definitely known to have been afflicted with gangosa, or rhino-pharyngitis mutilans, the name suggested for the disease by naval medical officers, died at St. Paul's Hospital, in this city, during the month of January. Cases may have occurred in the past, but, if so, they have escaped recognition. Extensive inquiry among Filipino and Spanish physicians who have been in the islands many years tends to show that, while cases of a disease with similar symptoms have been observed, they were generally regarded as leprosy and no distinct separation was ever made. The disease is an infectious, painful, and disfiguring malady, due to a cause prevailing extensively in Guam, but the nature of which is still unknown. The nose and upper part of the face are destroyed by slow ulceration, while the tongue is never affected. Cases have been observed in persons from 3 to 80 years of age. The disease sometimes lasts from several months to a number of years, and even during this period, in its active stage, there is no reduction in flesh or strength. The mortality is low, yet the disease, however, is not very amenable to treatment, although antiseptic methods appear to retard the extension of the ulceration.

During the time that lepers were being collected from the island of Leyte a case with many of the symptoms of gangosa was encountered and removed to the San Lazaro Hospital, in Manila, where it died the latter part of May. A careful autopsy was made, but owing to the microscopical work not yet having been completed it is not possible to state whether the case was one of gangosa or not.

PARAGONIMUS WESTERMANII INFECTION.

During the year the pathologist for Bilibid hospital found 17 persons at Bilibid prison who were infected with Paragonimus westermanii. Of these cases 8 were fatal, the diagnoses having been made at autopsy. Medical men connected with the hospital are of the opinion that the disease is much more common in the Philippine Islands than has heretofore been thought to have been the case. It is believed that many of the cases which are now diagnosed tubercle of the lungs are in reality fluke infections. In several of the cases trematodes were not confined to the lungs, but were found in various organs of the body and particularly in the brain. In making sections of the lungs a large number of burrows are usually found to be scattered throughout the organs, and in the burrows a material which is similar to that of the sputum found in living cases is encountered. The walls between the burrows frequently break down and thus make large cavities.

MEASLES.

Measles has continued to be a most rare infection in the Philippine Islands. Only 3 cases were encountered during the year among Filipinos, but importations of this disease took place. The transport *Logan*, which arrived here during the latter part of March, had on board 2 cases of measles among soldiers, and upon their being transferred to Fort William McKinley several additional cases developed. Owing to the prompt measures taken by the military authorities, no further spread of the disease took place.

MALARIA.

During the year 23 deaths less from malaria were reported for the city of Manila than for the previous year, the total number being 173. On account of the fact that the great majority of these diagnoses were not confirmed microscopically, it is exceedingly doubtful as to whether there was actually that number of deaths from this disease in the city. The Anopheles mosquito is not very common in Manila, and it is believed that the majority of the cases of malaria are contracted outside of the city. In the provinces, particularly in Albay and the Camarines, the disease has been very much less than heretofore, which fact can be ascribed perhaps to the free distribution of enormous quantities of quinine which have been issued to residents of these districts. The question of mosquito extermination in the Philippines, with reference to reducing malaria, will be taken up in another part of the report.

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INSANITY.

In the United States 1 insane person (with the insane are included the feeble-minded) is encountered in every 466 of the population. These figures are based upon a population of 70,000,000 and only include those persons who are confined to hospitals or other institutions. In Great Britain 1 person out of every 304 is insane, and in the Philippine Islands 1 person out of every 1,667 is reported as being insane. This would indicate that insanity is far less prevalent in the Philippine Islands than elsewhere. These figures are particularly significant in view of the fact that consanguineous marriages in the Philippines are said to be very common, and since such marriages have been ascribed as one of the principal causes of mental derangement, it is noteworthy that they seem to have no effect in the Philippines as a cause of insanity. It will be interesting to note in the future whether the increased nervous tension which naturally accompanies a higher civilization will be conducive to an increased proportion of insane in the Philippine Islands. The percentage of recoveries at the San Lazaro Insane Hospital compared favorably with results reported in Great Britain, there being 27, or a percentage of 19.

The bureau of health census of the insane of the Philippine Islands shows that there are 1,969 males and 1,480 females, or a total of 3,449. Of the 1,969 male adults 1,422 are single, and of the 1,480 female adults 922 are single. Three hundred and seventy-nine male adults and 313 female adults are married, while 104 males are widowers and 202 females are widows. It is probable that in this census weak-minded persons are included as insane.

Mental disorders have undoubtedly received less attention from physicians in the Philippines than have any other class of disease. At the present time the municipalities are charged with caring for the insane, but in nearly all cases they are absolutely without facilities for so doing. If the insane are harmless they are permitted to go the even tenor of their way, and if violent the only remedy is to lock them up in the municipal jail or chain them in their houses.

Of the 3,449 insane in the Philippine Islands less than 300 are cared for in asylums. The bureau of health maintains by contract 164 in the Hospicio de San José, and there are accommodations for 90 in the insane department of San Lazaro Hospital.

The Commission recognizing the great need for further provisions for the insane, acted favorably upon the recommendations made in previous reports and on December 26, 1906, appropriated the sum of ₱55,000 to erect and equip a new insane ward at San Lazaro Hospital for the care of 250 additional insane. This building, plans of which were drawn by the consulting architect to the Commission, is of the most modern type, being constructed of reinforced concrete. It is believed that this type of structure is an ideal one for the Philippine Islands, as it successfully meets several indications, the most important of which is that it is as near earthquake proof as any building can be, as shown by the experience in the San Francisco disaster. It also insures protection from heat and resists the effects of the prolonged rainy season. Stone buildings nearly always become damp and musty, and frame buildings do not resist the elements and are very dangerous because of the facility with which they take fire during the dry season. This new building is a radical departure in hospital construction and will serve as a guide for the future. As soon as proper facilities are provided this bureau will recommend a law to cover the commitment of the insane. The procedure at this time is to have the patient arraigned in the courts, after which a committee of medical men is appointed to make an examination and report the condition. It is hoped that with the increased accommodations, which will be available by August 15, 1907, the most pressing cases may be taken care of. The bureau has been much embarrassed in the past in not being in position to provide for many cases that were brought to its attention.

The distribution of the insane by provinces is the subject of a detailed statement to be found elsewhere in this report.

AMOEBIC DYSENTERY.

There was again a decided increase over the last year in the number of deaths reported in the city of Manila from amoebic dysentery, 344 deaths being recorded, as against 288 for the year preceding. Believing that much good might be accomplished by giving instructions, particularly with regard to the prophylaxis of this disease, Bulletin No. 6 has been prepared and arrangements have already been made with the bureau of education to have it taught in the public schools throughout the Philippine Islands. It is hoped that by disseminating knowledge with regard to dysentery by this general method the prophylaxis may become better understood and the number of persons who are afflicted with this disease gradually lessened.

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LEPROSY AND ITS TREATMENT.

While our knowledge with regard to the cure of leprosy has not been materially enhanced during the year, yet the policy of segregating lepers at the Culion Leper Colony bids fair to free the Philippine Islands from this most loathsome disease. The reduction in the number of lepers in the Philippines, which was so confidently hoped for, even after a portion of the territory has been rendered free from sufferers from this disease, has been more than fulfilled. At the close of the last fiscal year there were 3,494 lepers in the islands; at the close of this fiscal year the records show that the number has been reduced to 2,826. This reduction, in a large measure, has been due to the fact that in those islands from which the lepers have been removed no new cases occurred so far as can be determined, and also to the fact that in a number of islands, and more particularly in Samar and Leyte, many unfortunates who were afflicted with disfiguring, ulcerating diseases were classified as lepers, but on careful microscopical examination were found free from the disease.

In the work which was recently undertaken in collecting lepers from the islands of Samar and Leyte, for the purpose of transferring them to the Culion Leper Colony, considerable additional evidence has resulted in showing that many of the diagnoses of leprosy which have heretofore been made were erroneous. In order that the matter might be placed upon a definite, scientific basis, the steamer which was sent for the purpose of collecting lepers was fully equipped with a bacteriological outfit, and several competent microscopists accompanied the expedition for the purpose of making microscopical examinations of all cases before they were taken on board and of studying some of the skin lesions which are so frequently encountered, and many of which have undoubtedly been diagnosed as leprosy heretofore. In order to aid this work as much as possible, and with the hope of having an opportunity to have as many cases of skin lesions as possible present themselves, instructions were sent out in advance to the local officials to have every person present ready for microscopical examination who showed any evidence, even though slight, of being afflicted with leprosy or who had any ulcers or contractions of any sort. In this way several hundred persons were brought to the different ports, and in many cases they presented a most repulsive appearance, but on microscopical examination they were found to be afflicted with tropical ulcers, phagadenas, or syphilis. Quite a number of cases of the latter were found, particularly on the island of Samar. The Spirochaete pallida was demonstrated in many cases.

In collecting lepers no serious difficulty was encountered and so far this feature of the work has given rise to less friction than would ordinarily be expected to be the case. The attitude of the people was no doubt largely brought about by their learning that excellent accommodations and care are given to lepers at Culion, the greater majority of them, no doubt, having better houses, better clothing, and better food than they have enjoyed before their transfer to that island, and this, coupled with the fact that they are not compelled to work, has a strong tendency to make them contented. The fact that many cases were not accepted as lepers, and that in many instances proper treatment resulted in their speedy cure, also made a most favorable impression upon the people and did much to gain their confidence in the efforts of the bureau of health.

From the foregoing it will be evident that if new infections can be prevented the natural mortality among these unfortunates will soon result in the complete solution of this problem.

All lepers, so far as known, have now been removed from the islands of Mindoro, Masbate, Romblon (which includes Tablas and other islands under the same provincial government), Siquijor, Negros, Panay, Palawan, Cuyo, Camaguin, Bohol, Samar, Leyte, and Marinduque. The work of removing them from Cebu is now under way, over one-half having already been transferred to Culion. From the foregoing, it will be seen that fully one-fourth of the territory of the Philippine Islands, or 28,615 square miles, has been freed from leprosy.

At the close of the fiscal year the total population at Culion Leper Colony was 739. Accommodations are now available at Culion for 1,000 lepers, and the Commission has already informally expressed its willingness to appropriate the necessary funds for taking care of that number at the colony, so that the work of completing the collection of lepers upon the island of Cebu can be completed at once, and when this is done practically the entire Visayan group of islands will be free of this disease.

Up to the present time the policy of not permitting nonleprous friends and relatives of lepers to accompany them to Culion has been strictly adhered to. For such persons as may desire to be near their afflicted relatives arrangements can be made to reside on the island of Busuanga, which is only a few miles away, and from which place frequent visits to Culion will be permitted.

The policy of not permitting nonleprous persons to reside at Culion may seem cruel and heartless, especially to those who are directly affected by its operation, but it

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is hoped that the close proximity of the island of Busuanga, where they may reside, will do much to mitigate this objection. Isolation is for the best interests of all concerned, for the benefit of the patients, and for the protection of the public. It is unfortunate that in this particular the ends of science and sentiment must diverge, but it is very much to the credit of the persons who have been most affected by this policy that they have been most reasonable in accepting the wishes of the government with regard to this matter.

In view of the experience obtained in Hawaii, in Europe, and other countries, and the experience of the past year in the Philippines, it is thought that whatever may be the views of well-informed persons with regard to the communicability of leprosy, and however widely eminent medical men may differ upon this question, yet the incontrovertible fact remains that every leper capable of giving off the leprosy bacilli to the media that surrounds that leper is at least one source of infection, and the utter hopelessness of successfully eradicating the disease so long as the exact mode of transmission is not conclusively proved will be apparent to all, and prophylactic medicine should not be permitted by a few sentimentalists to be turned from its march to a goal which offers the magnificent victory of the eradication of this plague from the face of the earth, and the saving of hundreds of human victims who are now sacrificed annually to this most loathsome disease.

X-RAY AND OTHER TREATMENTS FOR LEPROSY.

After the most vexatious and annoying delays the new X-ray apparatus was secured in the United States and finally installed ready for use at the San Lazaro Hospitals about the 1st of November. The present outfit consists of:

One Kny-Sheerer Company's induction coil, type "B", 18-inch spark.

One motor generator for alternating current to suit coil and to operate on city current of 220 volts and 60 cycles (single phase).

One combination wall switchboard, including volt-meter, ammeter, lamp, etc. (latest type).

One mercury turbine interrupter.

One electrolytic interrupter, Wehnelt's patent; 3 platinum points, different sizes.

One vibrating interrupter, including condenser.

Two mica spark gaps.

Four tubes, wires.

One Kny-Sheerer floor tubes stand.

One fluoroscope, double cyanide 8.×10 with lead glass screen.

One hydrometer syringe.

Four Muller's X-ray tubes with patented vacuum regulator.

Four Muller's X-ray tubes, water cooled, with patent vacuum regulator.

Four Gundlach X-ray focus tubes with principle; diameter of bulb, 6 inches; sparks, 20 inches.

Two yards lead foil rubber sheeting; rubber on both sides, thin.

In supplying the following data for this annual report it is proper to state that it is not the purpose to enter into a scientific discussion of the treatment of leprosy; this will be due later when more observations are available and the same published in a medical journal, but on account of the general interest in this subject the following is respectfully submitted:

On November 2, 4 patients were placed under treatment; November 3, 3; November 4, 4; November 5, 1; November 6, 6; November 7, 10; and April 30, 1907, 1, making a total of 29 cases actually treated. The results, up to the close of the fiscal year, are as follows:

Very markedly improved	8
Considerably improved	13
No change	7
Died	1

From the foregoing it may be seen that so far, at least, the X-ray has not proved a specific for the cure of leprosy, yet better results have been obtained than with any other treatment that has heretofore been used, and even if the percentage of recoveries should be no larger than in the past it would at least offer some hope to individuals afflicted with this disease.

In treating these 29 cases they were chosen much in accordance with the rules which prevailed with the cases that were treated so successfully in 1905, namely, cases of the tubercular variety which showed a large number of hypertrophic lesions, especially those having enlarged ears and noses. The regular Gundlach tube was used, and from 90 to 100 treatments have been given in the majority of cases. The exposures have been for ten minutes at a distance of from 5 to 10 inches, the intensity of the light used

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being sufficient to give a distinct outline of the bones of the hand and wrist. The treatments were given at first every three days and later every second day, experience having demonstrated that patients are unable to stand more. The eyes are invariably protected by suitable shields. After a short time nearly all of the patients presented a very much blackened countenance, but this does not seem to make them uncomfortable. In the few instances in which burns were produced they healed very kindly and in a very short time. Partial alopecia was produced in about one-fourth of the cases. The 1 death was due to lobar pneumonia and was apparently in no way connected with the X-ray treatment.

In the 7 cases which showed no change all at least are in as good health as when the treatment was begun, and if no improvement has been brought about in several of these cases at least the progress of the disease has been temporarily arrested.

Of the 13 patients who showed improvement their general health is as good, if not better, than when treatment was undertaken. Clinically, the improvement consists in a reduction in the size of the ears and nose, and the disappearance of numerous leprous nodules in various portions of the body.

Of the 8 that showed marked improvement the hypertrophy and infiltrations have almost entirely disappeared, and the only evidences of the disease they present are the scars which are left from previous ulcerations. Several of them still have partial contractions of the fingers. Three of the foregoing are frequently found negative upon microscopical examination.

In addition to the treatment by the X-ray, almost every other remedy which has been suggested has been tried, if the same could be applied with a reasonable assurance that it would not be detrimental to the patient. The treatment by Chaulmooga oil with strychnine has been highly recommended for the treatment of leprosy, some cures having been reported from the colony in Louisiana, and also used with considerable success in India and Africa, but the results were not sufficiently encouraging to make the cases worth while reporting here. In 1 of them there was apparently some reduction in the size of the lesions, but at best it was very slight.

During the month of February through the kindness of Dr. Kannosuke Miyajima, who was delegate of his Imperial Japanese Majesty's Government to the Philippine Islands Medical Association, the bureau came into possession of a number of bottles of leprol, which is an oil now being tried in Japan. This has been persistently used since that date upon 2 cases and, clinically, they are very much improved, but still show the leprosy *bacilli* in their tissues. With the exception of the X-ray, this leprol produces better results than any other treatment which has been tried heretofore.

We are constantly in receipt of letters from various portion of the world which suggest methods of curing leprosy, but it is found, when request for samples of the remedy is sent and information with regard to its composition is asked that it is usually unanswered.

CONCLUSIONS.

The foregoing experiences are not sufficient upon which to make a definite statement with regard to the value of the X-ray treatment as a cure for leprosy, and considerable more work in this direction will be necessary before any reliable statement can be made upon this subject.

SMALLPOX.

During the year there has been unquestionably less smallpox in the Philippines than has been the case for a great many years previous. In the provinces of Cavite, Batangas, Cebu, Bataan, La Union, Rizal, and Laguna, where heretofore there have been more than 6,000 deaths annually from this one cause alone, it is most satisfactory to report that since the completion of the vaccination in the aforesaid provinces, more than a year ago, not a single death from smallpox has been reported; from which it may be seen that, if the bureau could show no further result for the year than the saving of these human lives, it would more than have justified its existence. In fact, if any justification were needed for American occupation of these islands, these figures alone would be sufficient, if nothing further had been accomplished for the benefit of the Filipinos.

The question of smallpox will receive further consideration under the head of vaccination.

VACCINATION.

When the great Edward Jenner was a medical student, the casual remark made by a farmer's daughter that she could not take smallpox because she had cowpox so impressed him that he began an investigation of the question with the idea of devising some means for lessening the terrible scourge, which at that time was devastating

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all Europe. It is doubtful whether any people have benefited more from this discovery than residents of the Philippine Islands. So thoroughly are the Philippines saturated with the contagion of smallpox that probably 25 per cent of the residents would soon succumb to this disease if it were not for the ability to protect the inhabitants against it by vaccination.

Vaccination is one of the most accurate and triumphant discoveries of medical science. It was the first important proof of the ability to prevent disease by immunization. Jenner's announcement created great opposition at the time, and even to-day there are antivaccination societies in nearly every portion of the world. The only explanation for this state of affairs appears to be the innate perversity of human nature. No sane, reasonable individual could very well deny the efficacy of vaccination if he were acquainted with the systematic regularity with which the bureau of health eradicates smallpox from communities almost every week in the year, with no other weapon than vaccination. Owing to the liberal provisions made by the Commission during the past year, it has been possible by systematic methods to vaccinate 2,022,380 persons, which is an increase of 1,072,255 over last year. Fifty thousand more were protected by vaccine used by local officials at places where the disease made its appearance. These figures probably represents a greater number of vaccinations in proportion to the number of inhabitants than have ever been vaccinated in any country in a similar period heretofore. The complete cessation of deaths from smallpox in the provinces in which the people have been thoroughly vaccinated is the best answer to doubts which may be offered as to the efficacy of vaccination.

Since the beginning of systematic vaccinations there have been 3,515,383 persons vaccinated. Of this number 1,315,478 were reported as successful vaccinations, and since only 2,401,806 were inspected after vaccination took place it is quite probable that even a larger percentage of "takes" was produced than the figures show.

During the year further experience with vaccination indicated that a few minor changes were desirable in the instructions which were used as guides for vaccinators, and a modified circular was issued as follows:

"MANILA, *March 13, 1907.*

"CIRCULAR F-8.

"*Regulations for provincial vaccinators.*

"1. Circular C-28, April 18, 1904, and E-8, February 13, 1906, from this office, and all circulars amendatory thereof are hereby revoked, and the following regulations will hereafter govern vaccination in the provinces:

"2. *Organization.*—Vaccinators will be assigned to groups under charge of a district health officer or other employee of the bureau of health who has been designated as in charge, who will be responsible for the proper performance of the work. The inspector in charge will personally supervise, to the fullest extent practicable, the work of his group. No unnecessary details of vaccinators for clerical work, to the exclusion of actual vaccination, will be allowed. One clerk will ordinarily be sufficient for a group, and he should be able to devote the greater portion of his time to actual vaccination.

"3. *Itinerary.*—Upon being assigned to a province, the inspector in charge will arrange an itinerary for that province which will take up its various municipalities in such order as will cause the minimum expenditures for traveling expenses, at the same time due regard being had that sections which are not accessible in the wet season are vaccinated in the dry season. A copy of such itinerary will be forwarded to the director of health for his information. A provincial group will usually work as a whole within a municipality, and each municipality will be completed before proceeding to the next. Departures from the regular itinerary or the division of a group among two or more municipalities will only be made in case of emergency, the reason for such departure from the itinerary being reported by letter to the director of health as soon as possible.

"4. *Order of work.*—Upon arrival in a town the exact official census of the same should be ascertained, and the work shall not be considered completed until such number of persons have been vaccinated as will correspond to the census.

"Whenever practicable the inhabitants of a barrio will be caused to present themselves at some central point in such barrio at an hour previously arranged with the concejal or teniente of the barrio, and a sufficient number of vaccinators will be detailed to vaccinate the entire population of such barrio promptly. When such an arrangement is impracticable, barrios and pueblos will be taken up systematically, street by street and house by house, until finished. In vaccinating large barrios at such distance from the población as to require hiring of transportation, the vaccinators detailed to such a barrio should not leave the barrio until the work is completed.

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"5. *Conduct of vaccinators.*—Vaccinators will be required to wear the prescribed uniform while on duty; to keep their person and clothing neat and clean; to give especial attention to their hands and finger nails, and to comport themselves with proper courtesy and consideration toward the public.

"6. *Who shall be vaccinated.*—No persons will be excused from vaccination except infants under one month; those suffering from an acute illness; extreme old age, and persons presenting satisfactory evidence of having been successfully vaccinated or of having had smallpox within the preceding twelve months. Hysteria or 'nervios' and pregnancy will not be accepted as cause for exemption.

"7. *Method of performing vaccination.*—Inspectors will see that vaccinators observe the following routine in performing vaccination:

"(*a*) Scrub site of vaccination with a pledget of cotton wet with alcohol.

"(*b*) Sterilize lancet in alcohol flame.

"(*c*) Shake tube of virus.

"(*d*) Take virus on blade of lancet.

"(*e*) Scarify, stretching skin with other hand.

"(*f*) Rub virus into scarified area with flat of blade.

"(*g*) Warn person vaccinated not to touch scarified area nor to allow clothing to do so until thoroughly dry.

"(*h*) No further care is necessary.

"8. *Certificates of vaccination.*—For each vaccination performed the vaccinator will deliver to the subject thereof a certificate properly filled out on Form 36, B. H. Certificate numbers will run serially for each municipality. The attached slip will be delivered undetached from the certificate, to be subsequently detached and turned in by the vaccinator making the inspection.

"9. *Vaccinator's reports.*—Each vaccinator at the close of the day's work will be required to make the proper entry upon Form 60, B. H., from the stubs of his certificate book.

"10. *Inspections.*—When making inspections, each vaccinator acting as inspector will note the result of the vaccination on the certificate and detachable slip, and will take up the slips and turn them in at the close of each day's work.

"11. *Amount of work to be accomplished.*—Vaccinators will be required to work at least eight hours each day, except Sundays and legal holidays. Local holidays will not be observed. It is expected that the average number of vaccinations performed daily will not fall below 100.

"12. *Other reports from vaccinators.*—Vaccinators will be required to make report of all lepers, insane, blind, and deaf and dumb, and of all dangerous communicable diseases encountered by them. The records of the municipal board of health or of the municipal secretary will be checked up with these reports, the necessary corrections made, and a copy sent to the director of health through the inspector in charge of the party. If dangerous communicable diseases be encountered, the inspector in charge will at once notify the president of the municipal board of health or the municipal president, and in conjunction with them arrange for the necessary measures of isolation, disinfection, etc.

"13. *Relations with local officials.*—Inspectors will cultivate cordial relations with the provincial and municipal officials and seek their cooperation, and any failure to secure same, with the reasons therefor, will be reported by letter to the director of health. Attention is called in this connection to a circular letter from the governor-general, addressed to all provincial governors under date of June 30, 1904, as follows:

" 'The bureau of health for the Philippine Islands is inaugurating a system whereby it is hoped that every person in the islands may be vaccinated and the danger of infection by smallpox effectually removed.

" 'The civil governor requests that you issue instructions to every municipal president in your province in respect to this matter, inviting attention to the provisions of act No. 309, Philippine Commission, and request them to render every assistance to the vaccinators of the bureau of health.

" 'Kindly acknowledge receipt of this circular and advise this office of the action taken in the premises.

" '(Signed) F. W. CARPENTER,
" '*Acting Executive Secretary.*'

"14. *Municipal boards of health.*—Presidents of municipal boards of health will be under the orders of the district health officers while vaccination is being carried on in their respective municipalities, and will assist in the work. It is believed, however, that their cooperation in securing the assembling of the inhabitants of each barrio at some central point, and in other similar ways, will facilitate the work to a greater extent than their actual presence as a member of the group of vaccinators. The cooperation

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of the municipal president and the police should be secured toward the same end when necessary.

"15. *Supplies.*—Requisitions for supplies, other than vaccine virus, required in the work of vaccination will be made on Form 1, B. H., and will ordinarily be made in such quantities as to cover the estimated needs for one month where communication with Manila is frequent and regular. Vaccinating parties operating in remote places where communication with Manila is infrequent and irregular should carry on hand a three or six months' supply, or sufficient to meet conditions. The following schedule may be used as a basis when preparing requisitions:

"One lancet, one-half pound cotton, and 8 liters of alcohol per man per month.

"One alcohol lamp per man.

"Four forms 1, B. H., per month each party.

"One hundred forms 36, B. H., per man per day.

"One book, Form 20, B. H., per man per month.

"Two forms 59, B. H., per month for each party.

"Two forms 60, B. H., per man per month.

"Four forms 115, auditor, per man per month.

"Bills of lading to cover shipments of property returned to Manila.

"The stationery to be used by vaccinating parties will, so far as possible, be confined to the following articles:

"Letter heads, rubber erasers, paper fasteners, black ink, scratch pads, blotting paper, wrapping paper, lead pencils, pens, and twine.

"Variations from the above will be made when experience indicates that it is necessary.

"16. *Vaccine virus.*—Shipments of vaccine virus for the supply of groups operating in provinces distant from Manila will be made in portable ice boxes, and requisitions will call for quantities in proportion to the frequency of communication, reliability of schedule, and facilities for preservation existing at the base of operations. Unless definite arrangements have been made with this office to have virus shipped at regular intervals, officials in charge of parties should invariably wire this office as to the number of units they desire shipped from Manila on a given date, for instance:

"'HEALTH, *Manila.*

"'Ten thousand, April 9th.

"'RUIZ.'

"Such information should always be forwarded several days before the steamer is expected to sail from Manila. Inspectors will be notified by wire of each shipment and will arrange to receive the virus promptly. Empty ice boxes will be returned to Manila by first available transportation, the date of shipment and name of vessel being wired to the director of health. Empty ice boxes should be returned by such steamship lines as have agreed to return them free of charge to Manila. When the base of operations enjoys frequent and regular communication with Manila, and is not more than forty-eight hours distant, vaccine virus may be sent by mail or other convenient method, without special measures for preservation, and requisitions should be frequent and for small quantities.

"17. *Alcohol.*—Whenever alcohol of 36 degrees strength can be purchased in the provinces for ₱0.50 per liter, or less, the same should be obtained there and separate bills, on Form 5-A, sent to this office for payment.

"18. *Pay of vaccinators.*—Vaccinators will be paid by check from Manila, on pay rolls made up and forwarded by the official in charge of the vaccinators, under the following rules:

"(*a*) The pay rolls will be made out in triplicate for the entire party on the 23d of each month (including that date) and certified by the officer in charge of the party and forwarded to this office immediately.

"(*b*) The 'Name,' 'Designation,' 'Period of service' (1st to 30th), and 'Authorized monthly rate of pay' columns only will be filled out before forwarding. The 'Amount received,' 'Signature,' 'Witness,' and 'Remarks' columns may be left blank.

"(*c*) On the last day of the month telegraphic reports will be made by the chief of the party of all absences during the month. The pay rolls will be held in this office until such a report is secured.

"(*d*) Each official in charge of a vaccination party will be furnished with a letter which will state the maximum number of vaccinators that may be employed and their rates of pay. In no case will pay rolls for an additional number be approved unless specific authority from this office is first had. The separate appointments heretofore issued by this office will no longer be required.

"Officials in charge of vaccination parties are authorized to use their own judgment with regard to promotions or reductions in salary, provided they do not exceed the

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highest rate authorized in the letter referred to above. It is suggested, however, that, except in extraordinary instances, vaccinators be paid at first a lower salary than that authorized and gradually promoted as they show efficiency in their work.

"19. *Traveling expenses.*—Traveling expense accounts must conform in all respects to the provisions of Circular F-6, March 9, 1907. Accounts for traveling expenses will be made out by each vaccinator monthly, in duplicate, on Form 8-A, and will be accompanied by receipts on B. H. Form 20, also in duplicate. Vaccinators will be restricted to third-class transportation when traveling by rail or water, and to a moderate amount of baggage in all cases. No transportation expenses will be allowed for vaccinators in traveling short distances between barrios, and after the vaccination of a barrio is commenced no transportation will be allowed, except under extraordinary circumstances, until the vaccination of said barrio is completed.

"Where the hire of carromatas or other vehicles is necessary, two or three vaccinators will ordinarily occupy a single vehicle. Inspectors in charge of vaccinating groups will carefully scrutinize and check each item in the expense vouchers of his vaccinators, seeing that the accounts are properly rendered and that the prices entered are not in excess of those paid by native residents of the locality in which the expenses are incurred. Failure to have complied with these instructions or the approval of excessive or unusual charges will be considered grounds for deducting the excess of overpayment from the salary of the inspector checking the items and certifying to their correctness. The district health officer's certification of the account will be received in lieu of travel orders for travel within the province.

"20. Whenever it is more economical for the government, vaccinators will be expected to walk if the condition of the roads will permit it; in other words, if the salary of the vaccinators for the time consumed in walking would be less than the transportation vaccinators will be expected to walk, unless there is some excellent reason to the contrary.

"21. *Consolidated reports.*—Immediately after the conclusion of each month inspectors will forward to the director of health a consolidated report on Form No. 59, B. H., of all vaccinations and inspections accomplished during the month by their groups, and will note on the bottom of such form the amount of virus on hand on the first day of the month, the amount received during the month, and the amount expended during the month and the amount remaining on hand on the last day of the month. All forms 36, B. H. (stubs), pertaining to each municipality will, when completed, be delivered to the president or the municipal secretary as a part of the permanent records of such municipality."

The foregoing instructions have been found so satisfactory in actual practice that very little friction has resulted. It is perhaps noteworthy to report that no case of loss of life on account of vaccination of these more than two millions of persons has come to the knowledge of the bureau, nor have any limbs been sacrificed, nor has there been a case of very serious infection resulting from vaccination reported.

It is believed that this record is more satisfactory than any that has heretofore been reported with regard to vaccination in any country in the world, and is conclusive evidence of the care with which vaccine is prepared at the bureau of science and also of the rigidness with which the instructions for performing vaccinations are carried out.

PURE FOOD LEGISLATION.

Legislation guaranteeing more wholesome food and purer drugs has been earnestly asked for by the medical profession for many years, and it is therefore most satisfactory to report that the Congress of the United States, June 30, 1906, passed an act, which went into effect January 1, 1907, which had for its object the accomplishment of the above purpose. It is reasonable to expect that no part of the United States will derive more benefit from this legislation than its tropical possessions, and it is confidently hoped that the enforcement of its provisions will result in still further improving the health conditions in the Philippine Islands. On November 9, 1906, the governor-general of the Philippine Islands called attention to this act in a proclamation and named certain officials to enforce its provisions, but later, on the recommendation of the attorney-general, who held that on account of differences between the judiciary system in the United States and that of the Philippine Islands the legal machinery for enforcing the act was not adequate, a new act was drafted embodying all of the act of Congress and making only such corrections and additions as would adapt the law to the Philippine Islands. This bill was passed as act No. 1655, on May 8, 1907, on which date the pure food and drugs act of the Philippine Islands became effective. A committee was appointed by the governor-general, consisting of H. B. McCoy, collector of customs; John S. Hord, collector of internal revenue, and Victor G. Heiser, director of health, and instructed to form suitable regulations for the enforcement of the act. The committee completed its labors in June and the act and regulations

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were ready for distribution by July 1, 1907. Owing to the very short time in which the merchants and others have had in order to become familiar with the requirements of the law and the time required to procure chemists from the United States who are competent to make the necessary analyses, up to the present date no active steps have been taken for its enforcement.

The regulations provide that, except for the collection of samples, the enforcement of the law shall be carried out by the bureau of health, with the provisions for appeals to the secretary of the interior. The laboratory work is to be done by the bureau of science. The act and regulations follow.[a]

IMPROVEMENT IN HEALTH CONDITIONS IN BILIBID PRISON.

At the time the bureau of health took charge of the sanitation and care of the sick at Bilibid prison, in September, 1905, the annual mortality rate was 238 per thousand.[b]

At the end of the fiscal year 1907 the rate per thousand had dropped to 13.5, which shows in a most effective manner the advantage of having experienced medical officers in absolute charge of the sanitation of public institutions, especially when it is necessary to confine a large number of persons in a small space.

MEDICAL SCHOOL.

The movement toward the establishment of a Philippine medical school, which had its origin at the second annual meeting of the Philippine Islands Medical Association in 1905, has met with complete success, and the school is now in actual operation under government auspices. A government building located on the Malecon drive was set aside for this purpose, and the necessary alterations to adapt it for medical-college purposes have been made. The city morgue will be removed to the building, so that any pathological material which may become available through such a source may be utilized for the advancement of science. Adequate light, airy lecture rooms have been provided, and excellent quarters are available for histological, pathological, bacteriological, and chemical laboratories. The first-year class commenced work on June 10 last and advanced classes were started during the first week in July. The course is five years. The curriculum is most complete and compares favorably with that of first-class colleges in the United States. The entrance and graduation requirements are in accordance with the rules and regulations of the Association of American Medical Colleges, which should insure a high standard of education.

The free beds maintained by the government in St. Paul's Hospital and in the new University Hospital, which has recently been opened, are to be utilized by the faculty for the purpose of instruction. In addition, by the courtesy of the officials in charge of St. Paul's Hospital, the out-patient dispensary will also be available for clinical teaching, the medical supplies being furnished by the bureau of health for this purpose. San Lazaro infectious diseases hospitals, Bilibid Hospital, the dispensaries of the bureau of health, and particularly the obstetrical service of the latter, will also be utilized in order to give clinical instruction. The important subject of hygiene is to receive fuller consideration than is usually accorded to it in medical schools. The course will give especial attention to vital statistics, food supplies, municipal and house sanitation, the management of epidemic diseases, and maritime quarantine, and the whole will be made thoroughly practical by making full use of the excellent facilities which the bureau of health and the quarantine service afford for this purpose.

It is also very encouraging to report that the Santo Tomas medical school, which has been in existence for a great number of years in the Philippines, has made extensive alterations in its course during the past year; new teachers having been engaged, new buildings and equipment have been made available, so that, all in all, medical education in the Philippines has received a decided impetus during the past year.

SANITARY REGULATION OF DAIRIES AND DAIRY PRODUCTS.

The sanitary code of Manila makes ample provisions for the sanitary maintenance of dairies and for the inspection and examination of dairy products. It prohibits persons suffering from contagious, infectious, or communicable diseases from working in dairies or assisting in the production, distribution, or storage of dairy products and specifies that all tables, receptacles, and utensils used in the dairies shall be maintained at all times in a cleanly condition and free from all noxious matter. The sur-

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[a] The act and regulations (act No. 1655) is omitted here, as it is a part of the volume of acts of the Philippine Commission, printed as a part of this report.

[b] A chart showing this in detail has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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face of the interior walls and ceilings of the rooms of every building used for this purpose shall be limewashed or otherwise covered during the months of January and July of each year, and the woodwork frequently and thoroughly scrubbed. The storage of dairy products has also been a matter of special ordinance regulation.

It is now unlawful to bring into the city or to sell or to offer for sale any milk that is not fresh and wholesome, or that has been watered, adulterated, reduced, or changed, in any respect, by the addition of water or any other substance, or by the removal of the cream; however, milk from which any part of the cream has been removed may be offered for sale or sold if the fact is publicly advertised on the cart or in the place of business of the vender or made known to the purchaser at the time of the sale. Adulterated milk is held to include (*a*) milk containing more than 12 per cent of milk solids, including fats; (*b*) milk containing more than 88 per cent of water or fluids; (*c*) milk containing less than 3 per cent of fats; (*d*) milk drawn from animals within fifteen days before or five days after parturition; (*e*) milk drawn from animals fed on any substance in a state of fermentation or putrefaction or any unwholesome food, like digman; (*f*) milk drawn from cows in a diseased or unhealthy condition, or from cows kept in a crowded or unsuitable place; (*g*) milk from which any part of the cream has been removed, and (*h*) milk to which has been added water or any foreign substance whatever.

In order further to protect the milk supply, it is provided that any person or persons owning or having in their possession, or being in charge of milch or dairy animals, the milk of which is to be sold in the city of Manila, shall cause such animals to be subjected to the tuberculin test, to determine the presence of tuberculosis prior to offering such milk for sale or use in the city of Manila.

The fact that milk is such a favored culture medium for most classes of bacteria makes it particularly liable to become the carrier of disease. Milk may also be dangerous because of the presence of disease-producing bacteria received from the animal or from the hands of the milker or from the air of the stable or milk house or from contamination by the utensils in which it is collected and stored. Pure and wholesome milk can only be produced from healthy animals, and even such milk may soon be rendered harmful through carelessness in collecting and storing. The precautions necessary for the production of pure and wholesome milk are numerous and exacting and include such measures as a selection of healthy milk-bearing animals, the strictest attention to their food and quarters, and the absolute cleanliness of the milker and of those who handle and market the milk, as well as the utmost cleanliness of all utensils employed in the dairy and store rooms.

A number of diseases may be conveyed through milk and some may be acquired directly from the animal, such as tuberculosis and inflammatory diseases caused by the streptococcus and staphylococcus pyogenes.

While the positive conveyance of tuberculosis from domestic animals to man is still disputed by some, especially that of bovine tuberculosis through the use of milk and meat of tubercular animals, because of slight morphologic and biologic differences between the bacillus as found in bovine and human tuberculosis, the trend of opinion to-day is toward the belief that milk of all tubercular animals is dangerous to public health. The food supply of milk-bearing animals has an important bearing on the character of the milk. When such animals are fed on distillery products, it is not unusual to find a considerable portion of them suffering from an inflammatory condition of the milk ducts. It has been demonstrated that when milk from animals suffering from this inflammatory condition is given to children it produces gastro-intestinal disorders and is responsible for many deaths. The character of the milk is also influenced by the character of the water, by the surroundings, and by the ventilation. Of the diseases conveyed in milk, apart from those derived from the cows themselves, may be mentioned typhoid fever, cholera, dysentery, diphtheria, and scarlet fever, and, of course, tuberculosis. The milk becomes contaminated through polluted water, by means of flies, or by means of infected hands or clothing of the milkers and others who handle the milk. These diseases are usually classed as water-borne diseases. They are almost as frequently conveyed by milk as they are by water, due to the fact that when the dairy utensils are washed in polluted water, or the milk is diluted with water containing disease germs, or has become contaminated by flies and other insects, every opportunity is afforded for spreading the infection. The only means of insuring safety is to use only the purest milk with which every sanitary precaution has been taken. It is almost impossible to attain this ideal condition in the Philippine Islands, so it is necessary to resort to sterilization.

In order to make it possible for the poorer classes to obtain a milk supply comparatively free from danger, it is necessary that the dairy business should be regulated by municipal ordinances. There is a direct ratio between the character of the milk supply of any city and the infant mortality of that city. The bureau of health has begun

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a systematic campaign for purer milk. Under the present conditions only partial success is hoped for, but even this may mean a saving of hundreds of human lives. The following reports of samples examined at the instance of this bureau will show a wide variation in the milk offered for sale in Manila. Of the first 213 samples examined at the laboratory only 131 were fairly good. The milk of the better-class dealers seems to be satisfactory. The small venders who peddle milk about the streets are the principal offenders, but on account of their being apparently ignorant of the law great leniency has been shown them. In many instances they frankly admit that they add water, cocoanut oil, rice flour, sugar, etc., in order to cheapen it, and they seem much surprised that objection is made. This office has patiently undertaken a campaign of education by having the sanitary inspectors explain the law to the venders, for it is believed that the time has now arrived when the provisions of law should be rigidly enforced.

There is more carabao milk used in the Philippine Islands than either fresh cow's or goat's milk. Within the last few years there have been increased importations of cattle from Australia and a number of Australian dairies have been established. The price of Australian milk precludes its purchase by the poorer people, who still use carabao and goat milk.

Practically all the butter and cheese used in the Philippine Islands is imported. At the present time this is undoubtedly for the best sanitary interests of the people, who have not yet been taught the art of properly preparing these important articles of food.

The following circulars will give a good idea of the character of the pure-milk crusade in Manila. The first embodies the instructions of this bureau as regards the manner of taking samples, and the second as to the warning notice which is accompanied by a table showing the quality of standard milk:

"APRIL 27, 1907.

"*District health officers in charge of health stations:*

"You are hereby directed to obtain a sample of milk of not less than 250 c.c. from that sold by venders in your district and forward the same to the laboratory early in the morning, in order that it may be examined while fresh. One sample only should be collected each day until the milk offered for sale by all dealers in your district has been examined.

"Care should be taken not to request a specimen from anyone who has already furnished a sample to the health officer of another district.

"You will exhibit this circular as your authority for requesting a sample."

"MAY 14, 1907.

"*District health officers in charge of health stations:*

"Inclosed herewith are copies of the results of the analyses of samples of milk which were recently collected by you, and from the same you will see that the quality of the milk sold by some of the dealers in your district is not what it should be. For your information and guidance there is inclosed herewith a copy of an analysis of what sound dairy milk and sound carabao milk should be. Any marked departure from this standard or alterations of the formula should be brought to the immediate attention of the person selling the same, by letter, which will in effect state the following:

"'I have the honor to state, for your information, that the sample of milk which was collected from you ....., 1907, has been analyzed and the quality found unsatisfactory. You are hereby informed that within a short time another sample of milk will be collected from you, and if, upon analysis, the same is found to be unsatisfactory you will be prosecuted in accordance with law.'

"After a letter, as indicated above, has been sent a sample should be collected within a few days, and if the same is found unsatisfactory the vender of the same should be prosecuted in accordance with the provisions of the sanitary code."

Sound dairy milk.

Reaction	Feebly acid.
Specific gravity	1.0297.
Bacteria	Always present.
Fats	Average 3.75.
Lactose	Average 4.42
Albuminoids	Average 3.76.
Ash	Average 0.68.
Total solids	Average 12.61.
Water	Average 87.39.

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Carabao milk.

Specific gravity	1.038
Fats	8.65
Sugar	4.19
Proteids	5.54
Ash	0.85

DISAPPEARANCE OF PLAGUE.

The following sanitary maps show in a most effective manner the success which has attended the efforts of the bureau of health in eradicating plague from Manila.

In 1903 there were 160 cases; in 1904, 94; in 1905, 41; in 1906, 20; while for 1907 there are no cases to report.[a]

SCHOOL HYGIENE.

In so much as so large a proportion of the ill health of the community is found in children of school age, and since a large percentage of this ill health can be prevented, the question of school hygiene is of far-reaching importance. It involves the site and drainage facilities of the land, the character of the building, the extent of the cubic and floor space, and the relations of window to the cubic space. It also takes in the question of light and ventilation, water supply, and sewage disposal. There has been more attention paid to the question of school hygiene in the Philippine Islands, especially in Manila, during the last year than ever before. The bureau of health has made joint arrangement with the bureau of education to employ a medical inspector for the city schools. In provincial towns the local health officers make periodical visits, and the district health officer inspects them when he is in the municipality.

The medical inspection of schools has reached the highest development in certain countries of Europe. In Hungary the position of school physician is one of considerable importance, and his duties are clearly defined by legislation. He is expected to examine and study the school buildings from a sanitary standpoint and to investigate the purity of the atmosphere in each room and to analyze it systematically from time to time. He is charged with inspecting the lighting, heating, and ventilation of the entire building and the taking of such measures as may be necessary to prevent overcrowding. He is also required to analyze the drinking water used in the schools and to see that the pupils are furnished with proper seating facilities. With regard to the health of the pupils, it is the duty of the school physician to examine all new arrivals. The examination is of such a character as to afford a permanent record of the condition of each child. These systematic examinations are repeated at stated intervals during the year and a careful record kept of the progress of each pupil with regard to the uniform and healthy development of the body. Considerable progress in the matter of school hygiene has also been made in the United States. The medical department of the Philadelphia high school for girls was established in 1893. Prior to this date the attendance of a physician was an emergency matter. Since the inauguration of the new department the services of a graduate of the Women's Medical College of Philadelphia have been secured, and the hours of attendance fixed at from 9 o'clock in the morning until the close of the session in the afternoon. This physician occupies and performs the duties of sanitary adviser, medical adviser, and general physician, and the effect of her teaching upon the young ladies of this school has been very gratifying. The bureau of health has secured a lady physician, Dr. Anna D. Peck, a graduate of the University of California, for these duties in Manila; and while as yet the work is in a formative stage, results are beginning to show. Doctor Peck has not only instructed the pupils, but the teachers as well. She has lectured before institutes on sanitary subjects, and has held many hygienic conferences on questions which young girls developing into womanhood should know.

The work is new, but a good beginning has been made, which in sanitary matters, as well as other fields of endeavor, is half the battle. To illustrate the importance of medical supervision of schools, it is only necessary to recall the fact that of 5,876 cases of disease found in the public schools of Philadelphia by the medical inspectors during the eight months of the school year 1900, 3,446 were contagious. Among these were 12 cases of diphtheria, 4 of scarlet fever, 112 of measles, 118 of mumps, 869 of contagious school diseases, 397 of conjunctivitis, 20 of whooping cough, 3 of typhoid fever, 2 of tuberculosis, and 8 of scabies or itch. In Manila the results of the preliminary work done during the latter half of the session, which ended in April, were as follows:[b]

[a] Four maps have been omitted and are on file in the Bureau of Insular Affairs, War Department.

[b] Omitted, and on file in the Bureau of Insular Affairs, War Department.

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PERSONAL HYGIENE.

The climate of the country is often blamed for conditions directly due to other causes. Indiscretions in diet and neglect to be vaccinated have probably caused more trouble, especially among newcomers, than the climate. About the first thing a timid new arrival does is to go around and secure from as many sources as possible advice as to how he should live. As each installment of this advice is different from all the rest, he very soon finds the kind which suits him best. If he happens to be a man, somebody is sure to advise him that alcoholic stimulation is absolutely necessary. For some reason or another men will take this kind of advice when they will take no other, notwithstanding the fact that experience and common sense both dictate that if there is any place in the world where alcoholic liquors are not desirable it is in the Tropics. In order to place before such people advice upon which they could rely, the bureau has published on cards, for distribution, the following health rules:

"It is easier to maintain good health in the Tropics than in the United States, but in order to do so you should observe the following simple rules:

"1. Be vaccinated to-day. The bureau of health will do it free of charge.

"2. Never drink any water unless it has been either boiled or distilled, nor eat any raw vegetables. If you observe this rule carefully, you will probably never contract dysentery, typhoid fever, cholera, or any other disease that originates in the intestines. Disregard of this rule is responsible for the return to the United States of over 50 per cent of the invalids who leave these islands.

"3. Fruit is wholesome and may generally be eaten raw with impunity, provided it is of a kind that grows upon trees well above the ground.

"4. Avoid patent medicines. Do not put drugs of which you know nothing into bodies of which you may know less.

"5. Alcoholic stimulants are not necessary, the advice of 'old resident' to the contrary notwithstanding.

"6. Generally disease-carrying mosquitoes fly only at night; therefore always sleep under a good mosquito net.

"7. Finally, observe the same hygienic rules that are applicable to temperate climates, including those of physical exercise."

SUPERVISION OF PILGRIMAGES.

One who is not familiar with the customs of Oriental people with reference to religious pilgrimages can have no idea to what extent the ingenuity of the health authorities is taxed to provide for these great emergencies. These occur at many places throughout the archipelago, but the largest is no doubt that which takes place at Antipolo, Rizal Province. This municipality has a normal population of 2,788, according to the latest census report. During the month of May each year thousands of people visit the pueblo to worship at the shrine of Nuestra Señora de la Paz y Buen Viaje (Our Lady of Peace and Good Voyage), and the daily population often reaches 10,000 or more. Many strange traditions adorn the history of this graven image, and many are those who believe in its miraculous healing power. It has been estimated on reliable data that fully 250,000 people, from every station of Filipino life, visited Antipolo during April, May, and June of this year and transformed for a short time the little village into a town with a large population and without proper facilities for caring for it. The pilgrims make great religious preparations for the event, but little thought is given to the sanitary necessities which so large an influx of people demand. There are serious phases of the situation which require active measures on the part of the health authorities. Every year it is necessary to install an emergency closet system and to send a soldier guard to prevent pollution of the drinking water. The regulation of the sale of food and drink also receives considerable attention, and on account of the great demand for food it is sometimes very difficult to prevent the sale of that which has already spoiled. This year both typhoid fever and dysentery appeared among the pilgrims; but since there was no spread, it is but natural for the sanitary authorities to believe that serious outbreaks were avoided by these prompt measures and perhaps thousands of lives saved.

SANITARY ORGANIZATION IN MANILA.

There are five sanitary districts in the city of Manila, conforming to the number and boundaries of the police districts. Each sanitary district is under the supervision of a district health officer and a force of inspectors, disinfectors, and sanitary police. Attached to each station are one or more municipal physicians and a municipal midwife to attend the poor. While these stations report to the director of health and are

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governed by the regulations of the central office, they carry on the details of their work in their own way. They are charged with the supervision of domiciliary sanitation, with the detection of nuisances, and the removal of special causes of disease. The district health officers act as coroner's physicians, render service in emergency cases, and are physicians to the policemen and firemen of their districts. They give advice on sanitary matters and supervise the food, milk, and water inspections. The municipal physician holds clinics and dispenses medicine.

TREATMENT OF OPIUM PATIENTS.

The opium act provides that a certain part of the revenue derived from the taxation imposed by it shall be devoted to the care of such patients as may desire to be cured of the habit. The bureau of internal revenue sent out its agents to talk with the people who were known to be addicted to the use of the drug, and many of them seemed anxious to apply for treatment. This office was notified that the number of patients would reach into the hundreds and was asked to make provisions for them. Accordingly, a contract was made with the San Juan de Dios Hospital, in Manila, and with the Mission Hospital, in Iloilo, to take care of all who applied. So far only 6 patients have been admitted to San Juan de Dios Hospital and 4 to the Mission Hospital. Three of the 6 Manila patients were Americans; the 4 Iloilo patients were Filipinos. The following tabulated statements will show the result of the treatment:

San Juan de Dios Hospital.

Race.	Sex.	Age.	Admitted.	Condition.	Discharged.
			1906.		1906.
American	Male	39	June 26	Improved	Oct. 9
Filipino	do	43	July 3	Cured	July 12
Do	do	44	Aug. 18	Improved	Aug. 22
Do	do	44	Aug. 28	Cured	Sept. 11
American	do	26	Dec. 27		Dec. 27
Do	do	32	do		Do.

Mission Hospital.

			1907.		
Filipino	Female	30	Feb. 7		(a)
Do	do	39	Feb. 8		(b)
Do	do	28	do	Improved	
Do	do	40	Mar. 2	Unimproved	

a Escaped February 26, 1907. b Escaped February 12, 1907.

By the terms of the contract they are kept in the hospital for only sixty days.

SANITATION IN PENAL SETTLEMENTS.

One of the most successful efforts that has engaged the attention of this bureau during the year has been the freeing of Iwahig penal settlement, on the island of Palawan, from malaria and the making of the place safe for human habitation. This settlement was begun by the Spaniards years ago, but on account of the excessive death rate caused by pernicious malarial fever it was abandoned. When the question of relieving the overcrowded condition in Bilibid was raised, and it became necessary to find a protected place to which the prisoners could be sent and from which they could not readily escape, attention was naturally turned again to this old settlement, which is favorably located and suitable in all respects, except in the matter of health conditions. It was thought by the application of modern sanitary science the place could be made inhabitable and work was begun with this in view. The results during the first half year were very discouraging, but with the passage of the reorganization act the sanitary control of the settlement was transferred to the bureau of health. It was obvious that radical measures were necessary, hence the first movement was the exclusion of all persons from the reservation who are not under the direct control of the superintendent. The next compulsory measure was the systematic prophylactic administration of quinine in gram doses, as advocated by Koch. The prisoners were lined up and each one was given the quinine and made to swallow it, so there could be no miscar-

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riage of the plan. Each prisoner was made to sleep under a mosquito net. All marshy and damp places were drained. In a few months the disease had practically disappeared. There were still to be found malarial-bearing mosquitoes, but as there were no patients from whom they could obtain the infection and transfer it to those who did not have the disease this species became no more dangerous than nonmalarial-bearing mosquitoes. The results of these measures were almost marvelous; in a very short while the number of sick in the hospital dropped from about 80 to 15.

As might be expected, the disease had became chronic in several cases, and these necessitated particular attention, in order that the mosquitoes might not become infected and convey the disease to well prisoners.

By the application of a few principles of sanitary science, what might have remained another "death trap" is now a well-ordered sanitary camp. This office would be unappreciative if it did not mention the great aid rendered, in bringing about this great result, by Major White, of the constabulary, who is now the superintendent of the colony. His work was of the highest order and was at all times characterized by patience, directive genius, and a determination born of a desire to succeed. Great credit is also due to Dr. Florentino Ampil, the physician of the colony, who has been in charge of the sick.

It is not customary to measure human lives by money standard, but if this were done the results in this instance would show that appropriations for health measures are from the first a profitable investment.

THE SANITARY CODE OF MANILA.

One of the first problems that confronted the military authorities upon entering Manila was that of sanitation. The provost-marshal-general appointed a committee to draft such sanitary ordinances as were needed to meet the existing conditions. The ordinances recommended by the committee were put into effect and so far as they went proved most satisfactory. They have been used as a basis for sanitary ordinances by cities in many parts of the Orient and even in America. In order to meet new conditions, the bureau of health recommended the passage of a sanitary code, not for the purpose of repealing the provost-marshal-general's ordinances, but more for the purpose of codifying them and making such changes as experience had shown to be necessary and in order that they might be printed in convenient form for general distribution, so that every resident of Manila might know his rights and his obligations. The commission, as a basis for the code, passed act No. 1150, entitled "An act further defining the powers and duties of the bureau of health for the Philippine Islands and of the municipal board of the city of Manila in connection with the preservation of the public health of that city and repealing certain provisions of law relative thereto." This act provided that, subject to the approval of the secretary of the interior, the director of health, acting in his capacity as the local health officer for the city of Manila, should draft and forward through the secreatary of the interior to the municipal board for enactment health ordinances for the said city, and that the municipal board should enact the ordinances so forwarded to it by the director of health, with the reservation that if the municipal board should consider any health ordinance, as drafted by the director of health, prejudicial to private interests or objectionable for other reasons it should return such ordinance through the secretary of the interior to the director of health, together with such amendments as it might deem advisable, and that the director of health should consider the amendments suggested and make such changes in the ordinances as he deemed advisable and return the same to the municipal board. In the event the amendments agreed to by the director of health and approved by the secretary of the interior should not prove satisfactory to the municipal board, the latter was given the right to appeal to the governor-general, whose decision was to be final. It will be seen that, while the initiative lay with the director of health, ample machinery was provided by which the members of the municipal board, representing as they do the people, could be final arbiters. It required a long time to prepare the code and to revise it so as to eliminate the needlessly objectionable features and make it as brief and concise as possible. The sanitary ordinances and regulations of other oriental cities were drawn upon and the conditions of these cities compared with those of Manila, so that such changes could be made as would adapt the text to the local necessities. Such of the provost-marshal-general's ordinances as had proved satisfactory and stood every test were incorporated; ideas were taken from the ordinances of the leading cities of America and Europe, and only in cases where no tested legislation covering the subjects could be found were there new and untried provisions recommended. The code was finally presented to the municipal board and the people accorded a public hearing; protest after protest was submitted; features which had been in working order ever since American occupation and given perfect satisfaction

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were declared oppressive, unnecessary, and revolutionary. Ideas which had been incorporated by the Filipinos themselves in local health regulations in many of the municipalities throughout the provinces were pronounced unjust and without precedent. Private interests affected by certain provisions of the code offered their protests. Every objection offered was carefully considered by the board and such concessions were made as were deemed advisable, so that the code as a finished product is rather different from the code as recommended by the bureau of health. However, it is a great step in advance and its enforcement will place Manila on a sanitary equality with the most advanced cities of the world. Provisions have been made for the cleansing, whitewashing, ventilation, and sanitary maintenance of buildings and premises; the prevention of overcrowding; the regulation of plumbing; plumbing materials, house drainage, and the making of openings in the streets; the collection and disposal of garbage and refuse and the removal of night soil; also for the regulation of tenement houses, lodging houses, hotels, and other similar places. The sanitary supervision of bakeries, dairies, public laundries, barber shops, places where food and drink are manufactured or sold; offensive trades and offensive and unwholesome businesses and occupations have been placed under ordinance restriction. The question of water supply has been carefully dealt with and the necessary legal machinery providid for the filling in of lowlands. A chapter dealing with the prevention, reporting, and suppression of dangerous communicable diseases, divided into four parts, has been included. The first part takes up the general suppression and prevention of such diseases; the second deals with buildings and premises infected with plague; the third is devoted to the suppression and prevention of cholera and other dangerous communicable diseases, and the fourth is devoted to leprosy.

The question of sanitation of the harbor of Manila, of rivers, esteros and canals and other waterways, and of vessels has been made the subject of a special chapter of the code, as has been also the destruction of mice, rats, insects, and other vermin. The question of the humane care of the unfortunate persons confined, detained, or kept in any private or public institution of the city of Manila because of sickness, deformity, imbecility, poverty, insanity, or other affliction is fully covered in a special chapter. The code also takes up the question of vital statistics and provides penalties for failure to report deaths and births. The subject of the disposal, transfer, and exhumation of the dead is also completely covered. Nuisances have been defined and the procedure for abating same carefully outlined. One of the most important chapters in the code is that relating to veterinary sanitation. The veterinary division of the bureau of health was transferred to the bureau of agriculture by the reorganization act and made the division of animal industry, but the director of health still retains such supervision over veterinary diseases as may be necessary to protect the public health.

The code was finally enacted October 20, 1906, and went into effect on January 1, 1907. Its usefulness and effectiveness have been considerably lessened by the constant agitation against it, led by certain Filipino physicians who object to the compulsory hospitalization of persons suffering from dangerous communicable diseases. The aim of the bureau of health has been to administer its provisions with due leniency and proper consideration for the local customs. Health officers can not please everybody, and their official duties render it necessary for them to do many unpleasant things. The interests of the public are paramount to the interests of the individual, but this idea seems to be very difficult to impress upon the oriental mind, due, perhaps, to the fact that their religious, ethical, and political training have magnified the influence and power of the individual.

THE PHILIPPINE ISLANDS MEDICAL ASSOCIATION.

The fourth annual meeting of the Philippine Islands Medical Association convened in the library of the bureau of science, Manila, the 27th day of February, 1907, held daily sessions four days, and was the best attended session which has yet been held. The governor-general delivered the opening address before a large audience. A scientific programme had been arranged, dealing almost altogether with original research work. The address of the president, Dr. Paul C. Freer, was entitled "A consideration of the modern theories in relation to immunity." The closing words of this scholarly address, which are significant and worthy of preservation, are as follows:

"The problems to be encountered in immunization are difficult. They involve painstaking experimental work and close reasoning and thought, but, as I have endeavored to show, the modern views of chemistry and physics are all on the side of the worker in immunity; he has but to reason closely to untangle one more skein of the web and his reward is great. In place of the constant fear of recurring serious

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epidemics of devastating diseases with their accompanying vast expenses, and in place of the constant vigilance necessary to prevent serious outbreaks of infectious diseases, the worker in immunity may possibly as a result of his studies in the future be able to render a community practically safe from all but negligible sporadic cases. We could then dispense with the rigors of quarantine and its interruption of commerce, or with the loss of life consequent upon the occurrence of epidemics. True, the prejudice against methods of immunization is as yet great, much more of a scientific nature needs to be done, much of a missionary character undertaken, but then not many years ago the very fact of the causation of disease by micro-organizisms was the subject of the bitterest dispute and many members of the medical profession itself were skeptical as to the results which were to follow. However, the opposition of the profession has practically disappeared; that of the laity will of necessity follow, and our successors will find the way for future advance cleared for them by the pioneers of to-day."

Official delegates were present accredited to the government of Hongkong, His Imperial Japanese Majesty's Government, and His Imperial Chinese Majesty's Government. Dr. J. M. Atkinson, the honorable principal civil medical officer of Hongkong, attended as the official representative and addressed the association on the subjects of plague and hemorrhagic septicæmia. Dr. Kannosuke Miyajima, delegate from His Imperial Japanese Majesty's Government, read an excellent paper based upon original research work on the subject of the cultivation of bovine piroplasma. His address, which was published in the May number of the Journal of Science, has aroused considerable interest in the scientific world.

Dr. Sia Tien Pao, delegate from His Imperial Chinese Majesty's Government, addressed the association upon the medical situation in China. Doctor Sia is a graduate of an American medical college and one of the most active and enthusiastic workers in the great scientific awakening which is now going on in his country.

Papers presented by local physicians have not been mentioned, but were all of the highest order. It would not be an exaggeration to say that, measured in terms of original search and scientific and practical value, no more important programme has ever been presented in the Orient.

The influence of these gatherings has been a powerful stimulus to research work in the East, and Manila bids fair to become the medical center of the Orient. At the third annual meeting representatives came from Japan, Australia, China, and the United States. A special committee upon foreign guests has been appointed for the next annual meeting, and an increased number of countries are expected to send delegates. The delegates have come in an official capacity, having been invited by the executive branch of the government. This arrangement fosters an official friendliness and stimulates a commendable spirit of rivalry between the scientific men of this part of the world.

PRISON SANITATION IN THE PROVINCES.

The Philippine Commission in passing act No. 1487, abolishing provincial boards of health and substituting therefore district health officers, very wisely provided that it should be the duty of such health officer to prepare and recommend to the director of health regulations for maintaining in a sanitary condition all prisons, jails, theaters, schools, colleges, and other private and public institutions within their respective districts. The first duty enjoined by this bureau upon district health officers, after the change from the old to the new system, was the preparation of sanitary regulations for the betterment of prisons and jails. These institutions, prior to the passage of the act referred to, had been entirely under the control of the local officials; the health officers could advise, but their authority and duty extended no further. Under the new law they have charge of prison sanitation and can see that their advice is followed. The results have been satisfactory, not only in their immediate relations, but especially with regard to their influence in awakening public sentiment along this line.

Santa Cruz, the capital of Laguna Province, has recently completed a new jail, the first in the Philippine Islands built after plans suggested by a sanitary engineer. This office detailed Mr. J. D. Fauntleroy, who was until recently chief of the sanitary engineering division of this bureau, to go to Santa Cruz and assist the local officials with his advice and knowledge, and the completed jail is a monument to sanitary ideas and sanitary progress.

Pangasinan Province will discard its old jail and build another on the same model as the Santa Cruz jail. Pasig, the capital of Rizal Province, has also fallen in line. This municipality is an important trading center for Rizal, Laguna, and Cavite provinces. Its situation at the junction of the Mariquina and Pasig rivers and in the direct line of commerce of the three provinces named makes it a commerical center for the smaller traders.

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Through the zealous efforts of District Health Officer G. I. Cullen the provincial jail at Catbalogan has become one of the most sanitary and best kept jails in the islands. At the Tacloban, Leyte, jail a considerable number of improvements have been installed, but there is still room for much improvement.

To the outsider it may seem a waste of time, effort, and money to give the question of prison sanitation so much attention, but when it is remembered that provincial jails are also used to some extent for asylums and poorhouses, and that heretofore they have been alarming factors in the perpetuation of beri-beri and in the spread of tuberculosis, the wisdom of the movement becomes apparent. Beri-beri, which is some times called "the jail disease," because it shows such a marked predilection for jails and prisons, has not been so prevalent in the provincial prisons as formerly, owing to the improved methods in sanitation.

Jails and prisons are reformatory in character. The old idea that they were solely for the punishment of evildoers is rapidly disappearing. Prisoners can not be reformed under worse environments than those in which they lived during their active criminal careers, and since sanitation has a direct moral or ethical bearing on the formation of character it is well worth all the time and attention that thinking people are giving to the subject.

BULLETINS.

Two complete bulletins upon the subjects of tuberculosis (No. 5) and amœbic dysentery (No. 6) were prepared during the year and a sufficient number of copies printed to supply all those who might be interested in the subjects of which they treated. The text was prepared in such a manner that it would be suitable for teaching in schools, and arrangements have been made with the director of education to have the same thus taught throughout the islands. A pamphlet was also prepared which is to be published by the bureau of internal revenue under the provisions of the opium law, which sets forth in a popular manner the evil effects which follow the use of opium.

NEW HOSPITAL CONSTRUCTION.

During the year the efforts of the bureau of health in keeping before the proper officials the inadequacy of the present hospital facilities in Manila and the great need for additional quarters for the care of the sick have received concrete recognition in the appropriation bills of the Philippine Commission. One hundred thousand pesos were appropriated for a new hospital at Bilibid prison; ₱20,000 for the installation of a proper sewer and toilet system; ₱20,000 for the installation of sanitary beds in the general prison; ₱55,000 for the construction and equipment of an addition to the present insane hospital at San Lazaro, to accommodate 250 additional patients, and ₱50,000 for the construction of a new hospital at Baguio, Benguet.

The question of a general hospital for the city of Manila, with plans and estimates, was brought before the Commission during December, but action was delayed until later, so that the matter of a general hospital for the city of Manila, which has been continuously recommended by the bureau of health, has not yet taken definite form. Modified plans and estimates prepared in consultation with a committee from the faculty of the Philippine Medical School will again come before the Commission early in August, and it is hoped that it will be possible to make an appropriation for this purpose, the necessity for which has already been so fully explained in previous reports.

CURATIVE CHOLERA SERA.

During the month of August, 1906, Doctor Denier, a bacteriologist of the Pasteur Institute, Saigon, arrived in Manila and requested permission to test the value of his cholera curative sera, which he has used with such excellent results in cholera cases in Saigon. The matter was brought to the attention of the Commission and its consent to his treating patients at the San Lazaro Cholera Hospital obtained. After about one month's trial, during which Doctor Denier treated 17 patients with his sera, of whom 12 died, giving a mortality of 70.58, he expressed himself as not feeling very much encouraged over the results following the use of his treatment and returned to Saigon. The results in cholera cases treated in the hospital at the same time by ordinary methods showed about the same mortality, so that no improvement over the method in use at San Lazaro was shown.

ARMY BOARD ON TROPICAL DISEASES.

The board composed of Capt. Percy M. Ashburn, assistant surgeon, U. S. Army, and First Lieutenant and Assistant Surgeon Charles F. Craig, appointed by the Surgeon-General of the Army for the purpose of making a study of the tropical diseases

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prevailing in the Philippines, has continued its labors and has reported a number of important results. Among other things it discovered a new *filaria*, which has been named *filaria Philippinensis*. This new filaria produces symptoms similar to *filaria nocturna*. The board made an extensive investigation into the mode of transmission of dengue and reported that it was impossible to detect any organism in the blood, but that its transmission in all probability was due to the mosquito *culex fatigans*, which is the principal night flier in the Philippines. Their work was brought to a sudden close by the subsidence of the epidemic of dengue which prevailed at Fort William McKinley, where they were making their investigations.

The board also examined into the question of *amœbæ*, which seriously affects the Philippines, and are of the opinion that they have discovered a staining method by which the *amœbæ coli* may be readily distinguished from the *amœbæ dysenterica*.

The work of these gentlemen has been a considerable stimulas to other scientific workers in the Philippines, and the continuance of such a board can only result in marked good to the islands.

COOLER WEATHER.

The Philippines during the month of January enjoyed unusual cool weather. The weather bureau has noted that January, 1907, was the coldest January and the coldest month since 1857. In the mountains of Benguet, near the Benguet Sanitarium, it has been stated that the thermometer actually registered 28° Fahrenheit. Ice of the thickness of one-fourth of an inch formed in exposed vessels. The temperature in Manila fell as low as 59° Fahrenheit (15° centigrade).

GUARDING MANILA'S WATER SUPPLY.

During the time cholera was present extra precautionary measures were necessary. Realizing that the salvation of Manila depended upon the protection of its water supply against contamination, the help of the military authorities was invoked and this important work placed in their charge. During the epidemic of last year Major-General Wood, commanding the army in the Philippines, at the request of the governor-general, dispatched on June 28, 1906, a detachment of troops to protect the watershed. In order to expedite the enforcement procedures, the Commission passed an act conferring on army officers the prerogatives of peace officers and empowering them to arrest and try those who violated sanitary ordinances and regulations. The municipal board of the city of Manila also passed in advance, as an emergency ordinance, the chapter on water from the then pending sanitary code, thus providing a method by which offenders might be brought before the courts of Manila for trial when it was deemed advisable to take that course.

The military authorities handled the situation with remarkable energy, tact, and success and rendered invaluable aid at a critical time, and due credit should be given them for the part which they have taken in the sanitation of the Philippine Islands.

DRINKING WATER.

The water used in the city of Manila belongs to three classes: Hydrant water, used by the natives generally; distilled water, used generally by the employees of the government, both military and civil; and bottled waters, used by the upper class of natives and richer Americans. The insular cold-storage and ice plant delivers distilled water to all employees of the civil government daily at a charge of 6 centavos (Philippine currency) per gallon. The military government furnishes its employees distilled water free of charge. A comparatively few use boiled water.

This office has been frequently called upon to investigate the cause of dysentery occurring in families using distilled or other sterile water, and in many instances there has been no difficulty in tracing it to careless handling of the ice, which is usually placed upon the sidewalk or upon the floor, and from which place it is taken by the muchacho at his leisure and placed without washing in the water cooler. This has been especially true of the government offices and explains why so many government water coolers are found to contain *amœbæ*. To overcome the source of danger, the director of health has devised and is ready to furnish drawings for a water cooler of simple construction, with a compartment for the ice and another fitted with tubes for the water, which arrangement prevents contamination of the water by the hands of the servants. There is no patent on the invention and it is not a "discovery;" it is a simple common-sense device for protecting drinking water.

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DISPENSARY WORK.

The bureau of health conducts seven free clinics in the city of Manila, one at each of the five health stations, one at the San Lazaro Hospital, and one at the Civil Hospital. It also maintains three public dispensaries, the general dispensary at the main office, one at the San Lazaro Hospital, and one at the Civil Hospital.

Station clinics are conducted every morning by the municipal physicians, and medicines are either supplied from the stock kept on hand or through the central dispensary.

A limited number of patients suffering from noncontagious diseases, who are unable to pay, are received into the ward of the Civil Hospital as emergency patients. The city of Manila has a contract for 50 free beds in the San Juan de Dios Hospital and 50 free beds in St. Paul's Hospital, and the insular government has recently made provision for 45 additional beds at St. Paul's Hospital. All cases of infectious diseases are taken care of free of charge in the infectious diseases departments of the San Lazaro hospitals. The insane are sent to the San Lazaro Insane Hospital or to the Hospicio de San José, with which the city of Manila has a contract. In addition to these clinical facilities for the poor, the bureau of health supplies medicines to St. Luke's Dispensary, connected with the University Hospital, to the Methodist Hospital, to credited missionaries, and to public school teachers for use among the indigent poor. In such provinces where there are neither drug stores nor private physicians the Commission has adopted a plan which it is hoped will relieve the most urgent necessities of the situation. This plan, which has already been put into operation in the province of Nueva Ecija, is as follows:

The sum of ₱500 was appropriated for the purchase of medical supplies to be handled by the district health officer. These supplies are sold to persons who are able to pay and distributed free to the indigent poor. The margin of profit on the sales is very small, and the money taken in is reinvested, so as to keep up the stock, the object being to make the provincial drug store self-sustaining and at the same time to conduct it without profit. There is no city in the world of the size of Manila that has better free-dispensary service for the poor—a service in which patients are treated with as much consideration as if they were the richest people in the country. The statistical tables published in another part of this report will show the number of patients who have availed themselves of the privileges offered.

The dispensary work is gradually being further extended more and more in the provinces. District health officers have opened small dispensaries at many of the provincial capitals, where poor persons may receive treatment free of charge. Many missionaries are extending medical aid in the different provinces in which they are stationed, and the bureau of health furnishes them medicines for the indigent poor, free of charge, in all cases where satisfactory references are given. In this way more distress is being relieved from year to year throughout the islands.

WATER AND WATER SUPPLY.

Water supply may be conveniently divided into three classes—surface, underground, and cistern. Surface supplies are drawn from streams, lakes, or artificial reservoirs; underground water from wells or other openings into the ground, and cistern water is caught during rains and, if it were not for the collection of atmospheric dust and bacteria in its downward passage and contamination by cistern wells, would be as pure water as it is possible to obtain. After it once comes in contact with the earth it is, strictly speaking, surface water, and as such is subject to all of its impurities. In running over and through the earth it takes up mineral salts and organic matter, gathering most of the former in passing through and most of the latter when passing over the ground. Every part of the crust of the earth is a great filter which removes all of the suspended matter and also removes or transforms most of the organic matter of the water as it passes over the earth's surface, provided the distance traveled is long enough. Underground supplies therefore, unless taken at a depth near the surface or from localities which are subject to special pollution, are generally more free from organic impurities and bacteria of all sorts than are surface supplies, while the latter usually contain smaller quantities of mineral salts. Deep wells in some localities yield water so heavily charged with mineral matter or with gases as to render it unfit for domestic use. Even the water from comparatively shallow wells may be quite hard owing to the excess of mineral matter. Water collected from cultivated fields is apt to contain much organic matter and clay, silt, or sand in addition. Water from forests, meadows, or swamps usually contains much vegetable organic matter.

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The most important and the most dangerous source of pollution is sewage. This affects surface supplies far more extensively than underground supplies. Public and private wells are often contaminated by near-by privies or cesspools. Mr. M. N. Baker, an able engineer, writing on the subject, has well said:

"In matters of water supply, above all things else, even the appearance of evil should be shunned; so the first principle of securing potable water is to avoid all supplies known or liable to be polluted and to choose those above suspicion. Where polluted water can not be avoided, every effort should be made to stop the pollution, and if this is not sufficient, then the water must be purified.

"In case a waterworks plant is being established or a new source of supply added, the first object should be to select water of the highest standard of purity. The qualities to be sought are so important that they may be mentioned again: Freedom from disease germs, substances that derange the human system, color, odor, taste, and sediment. The first is of the most importance by far.

"The ideal plan would be never to choose a water supply into which sewage, however small the quantity, is discharged, and never to allow such discharges into any existing source. It is difficult to carry out this ideal in any case, and the magnitude of the task increases with the size of the supply. We are, therefore, sometimes forced to consider whether some small or remote source of sewage pollution may not be tolerated in order to render an otherwise satisfactory supply available, especially if all other worthy of consideration are much more costly. If the pollution be small, some means of preventing it may often be found; if it is both remote and small, the danger is correspondingly lessened. But where shall the limit be placed? Both individuals and communities are loath to incur trouble or expense beyond a certain point in order to avoid remote chances of danger or death. Each case has to be, and should be, settled on its own merits. Regret it though we may, it sometimes becomes necessary to take some risks, lest the financial burden due to avoiding them be greater than can be borne. There is a limit by law in some places and by local public opinion everywhere beyond which tax rates and bonded debts can not pass. It is less of a burden on one's conscience and far safer for all concerned to urge that no sewage pollution should be tolerated than to name any small percentage of quantity in relation to the total amount of water or any distance at which the admission of sewage could be ignored.

"Fortunately there is always some avenue of escape from death-dealing water. Either a natural supply may be found, pollution prevented by legal measures, purification adopted, or, as a last resort, a dual supply may be provided, pure water in very limited quantities being furnished for drinking and cooking."

The city of Manila has an ordinance regulating the protection of its water supply. In times of cholera epidemics this law has been frequently invoked and in some cases enforced by military authority. Laws for the protection of water supplies are of little value unless backed by the force of public sentiment. The questions involved are often more than local in character. They are sometimes interstate and international in their scope. The prevention of water pollution is a broader question than the preservation of the water supply. Waters not used as sources of supply must be protected from such pollutions as will give rise to offensive odors. It is evident that if all population were excluded from drainage areas there could be no sewage pollution. The attainment of this ideal condition is possible only when the municipality or private company owns or controls the entire drainage area. Birmingham, Liverpool, and Manchester and many other cities in England have bought up all the land in the drainage areas of their water supply. The question has not been given the attention it deserves in the United States and its possessions. Manila has just extended its intake beyond the limits of population, and the entire new watershed is under the control of the government, and arrangements have already been made to guard against its being inhabited. The present watershed is inhabited by more than 10,000 people, on which account the city water is always a source of danger to the health of Manila, which becomes a serious menace when cholera makes its appearance, frequently rendering it necessary to guard the watershed with United States troops to prevent its pollution. When the new system is completed, the necessity for a patrol will no longer exist, because the intake is beyond the limits of populated territory. The engineer in charge of this work reports that the new water supply will probably be ready for use within a year.

The conditions are more serious in the provinces, where the danger of drinking polluted water is not recognized. The bureau of health has endeavored to help matters by urging upon the people the advantage of boiling, distilling, and filtering the water. The masses will not use boiled or distilled water, but have no objection to water which has been filtered. As mechanical filters were entirely out of the question, this bureau

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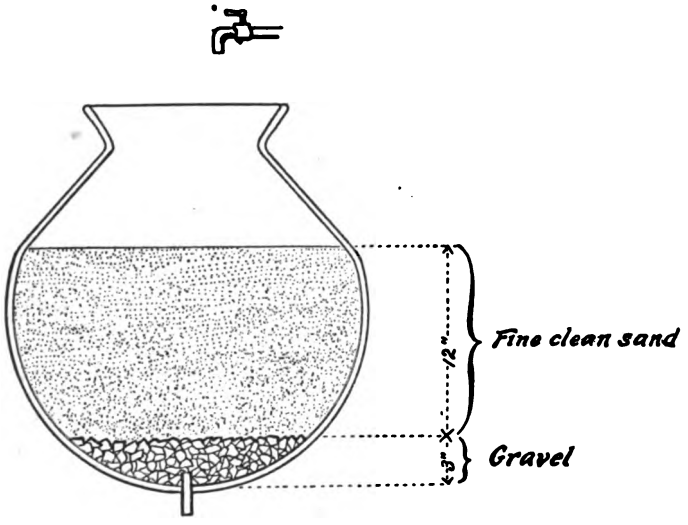
has devised a simple house filter consisting of an ordinary native banga, a jar made of clay, of the size desired, into which is placed 2 or 3 inches of gravel, and on top of this about a foot of clean river sand. The filter should be placed on a stand and under the faucet and a tap inserted in an opening in the lower part of the banga to allow the water to flow out after it is filtered through the two strata of different densities. It is not claimed that this process removes all the danger from the water, but it greatly lessens the number of organisms. It is advisable to pass the water through another filter after it has passed through the preliminary filter. These filters are within the reach of all, costing only a few centavos. They are easily cleaned. Bangas to the Filipino people are what water coolers and water buckets are to the Americans. The accompanying sketch will show the simplicity of the above-described filter:



It was formerly supposed that filtration was purely a mechanical process. It was believed that a mass of sand perfectly inert in itself would in no manner effect a chemical change in the contents of the water, but it is now known that water is purified while passing through a filter by the agency of nitrifying bacteria in the same manner as when passing through nature's great filter, the earth. These nitrifying bacteria take the organic matter and transform it into nitrates. After a filter has been in use some time a thin layer of sticky matter forms over its surface and thin films of the same substance cover every minute particle of the filtering material, especially in the upper layers. It is these layers and films that retain the bacteria. Here the organisms in the water, pathogenic and nonpathogenic, are retained and here most of them perish only a few inches from the surface. Those that penetrate deeper are liable to be caught in the same manner and in addition they suffer through the lack of food, since the organic matter on which they depend for a living has been changed before it reaches them. Thus it will be seen that it not necessary to change the filter's contents as often as might be supposed, yet it is also enjoined that filters should be kept clean. What was once considered a mere straining is now positively known to possess mechanical and antibacteriological properties as well. There are many disease germs which do not multiply outside of the human body, and the problem is that once having passed out to prevent their reentrance into their natural habitat. This is the principal object of all methods of water purification.

It is quite a simple matter to plan the protection of the water supply of Manila, but when the problem is attacked in the provinces it is quite another story. In most municipalities water-closets and privy vaults are practically unknown, the excreta being removed from the ground by pigs. If these pigs could be taught to do their duty, and nothing else but their duty, all would go well, but they wade into the rivers and into the streams, not so much to wash their dirty feet and noses as for the purpose of seeking other fields of filth to conquer. In the season of rains pollution is also carried into streams by the surface water which is discharged into them. To establish a system of waterworks in each municipality throughout the Philippine Islands is impracticable and could not be seriously considered, hence the bureau of

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health was confronted with the necessity of devising other means to protect the public. After due consideration, it was decided that artesian wells would come nearer affording the desired protection than any other available agency known. Great undertakings always move slowly, and no one who is familiar with the subject, knowing the financial conditions of the country, would question for a single moment the fact that to supply the 600 municipalities of the Philippine Islands with a sufficient number of artesian wells to accommodate the inhabitants is a stupendous undertaking, yet a start has already been made. Wells are in operation in the provinces of Pampanga, Bulacan, Cavite, and Cebu. In the province of Pampanga very satisfactory wells have been obtained at depths that vary from 100 to 135 feet and which flow at the rate of 20 to 50 liters per minute. Other wells in the same province with the surface at about the same sea level, but bored to a depth of from 180 to 200 feet, have a flow of from 75 to 114 liters per minute, and this amount is not much lessened in the dry season, while the amount from the more shallow wells is greatly reduced during this time.

The mortality in some of the towns which use artesian water exclusively has already dropped 20 per thousand over corresponding periods last year.

The Commission in some recent legislation (act No. 1662) has made it possible for many more municipalities to avail themselves of loans from the insular government for the purpose of installing artesian wells, so that in the near future still further reduction in the mortality can reasonably be expected.

LEGISLATION.

During the year several laws have been enacted for the regulation of questions which concern the health of the people and the interests of the bureau of health. One of the most important local measures from a sanitary standpoint is act No. 1526, entitled "An act for the prevention and suppression of Asiatic cholera," passed August 17, 1906. This act was passed to do away with the dangerous practice, confined almost entirely to Chinese market gardeners, of sprinkling growing garden produce with a mixture of urine, feces, and water, which serves the double purpose of fertilizing and irrigating the soil and satisfies at the same time the celestial's idea of economy. This filthy method, so common in Chinese farming, is a dangerous procedure in the Philippines, and has been the means of disseminating cholera and dysentery. It is now expressly forbidden for any farmer, market gardener, or other person to use any human excreta, excrement, dejecta, or the contents of any water or earth closet, privy, vault, cesspool, latrine, pail, or other receptacle for human feces or urine as a fertilizer on any land on which is grown any article or product intended for food or human consumption, or to allow any human excrement, excreta, or dejecta to be sprinkled on or applied in any manner or for any purpose to any crop, product, or vegetation grown on said land.

Another law which is of considerable importance to small municipalities is act No. 1530, amending the municipal code by giving to municipalities the right to charge a fee of not more than 50 centavos for burial permits and those for the removal of the bodies of deceased persons. The money derived from this source is covered into municipal treasuries and becomes available for local expenses, the item of sanitation receiving its share.

Act No. 1580, entitled "An act making appropriation for certain public works, permanent improvements, and other purposes of the insular government," while not remedial legislation, was of so much importance in the administrative operations of the bureau of health that it merits special mention. This act carried several sanitary appropriations—₱10,000 for the extension of the water system at the Culion leper colony; ₱20,000 for the construction of a sewer system in Bilibid prison; ₱20,000 for sanitary beds for the inmates of the said prison, and ₱55,000 for the construction of buildings and their permanent equipment in the San Lazaro Hospital grounds, in Manila, for the care of 250 additional insane persons.

Another law directly affecting the work of this bureau is act No. 1613, entitled "An act amending act numbered 308 and providing for the establishment of municipal boards of health and fixing their powers and duties." This act provides that with the approval of the respective municipal councils and that of the director of health district health officers may organize any two or more neighboring municipalities into a municipal health district, and the municipalities composing the district may employ jointly a president of the municipal health district, who shall act as president of the municipal board of health of each municipality comprising the said municipal health district and shall receive such compensation as may be appropriated by the respective municipal councils and approved by the director of health.

This act also provides for traveling expenses of municipal health officers, a provision which has never been made before and a lack of which has caused considerable embarrassment to the progress of sanitary work in the provinces. This new law will not

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only enable the bureau of health gradually to extend its operations, but will insure a more efficient service. Small municipalities that could not appropriate sufficient salary to employ the services of a physician may by combining to form a municipal health district make available such service.

Other legislation which indirectly concerns the bureau of health and the cause it represents is comprised in acts Nos. 1632 and 1651. The former provides that any graduate of the Philippine Medical School, established by act No. 1415, may upon graduation register his diploma with the board of medical examiners without examination, and establishes for each province one free scholarship in said school, to be awarded on competitive examination to graduates of public high schools. These scholarships are awarded on condition that each student who shall graduate from the medical school with the degree of doctor of medicine, unless he shall receive appointment under the government of the Philippine Islands or one of its branches, shall return to his province and practice medicine and surgery therein for a period at least equal to the time of his scholarship tuition. There has always been a lack of physicians in the provinces, especially in the remote municipalities. This does not mean that there are golden opportunities in the Philippine Islands awaiting American physicians, but that intelligent, well-educated native physicians are in demand—men who know the customs of the country and understand the language of the people and who will practice in the provinces. To supply this demand is the object of the new medical school and of the free scholarships which have been authorized.

Act No. 1651 authorizes that any graduate of a school of medicine or school of pharmacy in the Philippine Islands who shall receive therefrom the degree of doctor of medicine or licentiate of pharmacy shall, upon presenting his diploma from said school to the board of medical examiners or to the board of pharmaceutical examiners, as the case may be, be entitled to receive a certificate of registration without examination, provided such school of medicine or pharmacy shall have been duly incorporated, and shall also previous to the matriculation of said graduate in such school of medicine or pharmacy, as the case may be, have been empowered in writing by the secretary of public instruction, under such terms and conditions as he may prescribe, to grant diplomas and confer degrees in medicine and pharmacy pursuant to section 168 of said act No. 1459: *And provided further*, That such school or schools shall, in the judgment of the board of control of the Philippine Medical School, have brought its instruction in medicine and surgery or pharmacy to the standards prescribed for obtaining the degree of doctor of medicine in said Philippine Medical School, or to the standards of instruction fixed by said board of control for granting the degree of licentiate of pharmacy, as the case may be.

The pure food and drugs law, act No. 1655, has been discussed in another part of this report. The Philippine act is almost a copy of the American law enacted by Congress on June 30, 1906.

The pure food and drugs law is certainly one of the most needed, most righteous, and most important laws that was ever enacted in any country for any purpose, and it is the result of an awakening of the public conscience, which has for a long time apparently been sleeping on its rights and privileges.

Another appropriation act that deserves special mention is act No. 1662, which carries an item of ₱50,000 for the construction of a hospital building at Baguio, Benguet, in accordance with plans and estimates prepared by the consulting architect and approved by the director of health and the secretary of the interior, at a cost not to exceed ₱50,000.

This act under the head of "Artesian wells" created a permanent reimbursable appropriation to the credit of which has been deposited the sum of ₱37,000, appropriated by the act. All receipts which may accrue from insular bureaus, provincial and municipal governments, and other sources on account of services rendered and supplies furnished in sinking artesian wells and, when required, equipping said wells with the necessary pumping machinery, storage tanks, etc., necessary to provide potable water or fire protection, or both, when demanded by the public interest, shall be deposited to the credit of this appropriation. It is provided that the rates charged for the work done by the bureau of public works shall not exceed such as may be necessary to reimburse the appropriation on account of all expenses, including a surcharge to cover the cost of unsuccessful projects for which no charge is to be made.

The artesian-well system has been urged by this bureau as a health measure, and this substantial recognition of its merits practically insures the success of the movement. The question in its sanitary aspects is discussed under another heading.

The Commission in other appropriation acts has dealt as generously with the bureau of health as the status of the financial condition of the country would permit.

The principal sanitary legislation pending before the Commission is a bill for an act providing for the apprehension, detention, segregation, and treatment of lepers

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in the Philippine Islands. Heretofore the leper question has been handled under the general powers of the bureau of health as conferred by act No. 157, but in order that the status of these unfortunate people might be more clearly defined it was deemed advisable to present this new act, which pertains more especially to transferring of lepers from their homes to the Culion leper colony. A movement of this kind, as might be expected, always engenders a certain amount of opposition, which can be best met by direct legislation.

A bill for an act regulating the legal status of the insane has also been prepared.

POISONOUS FISH.

The Philippine Islands are bountifully supplied with fish, nearly all varieties of which are wholesome, but now and then reports reach this office of cases of fish poisoning which closely assimilate Asiatic cholera; and as this disease has been more or less prevalent from 1902 until the present year, the opportunity was not favorable enough to justify the time and trouble of a scientific investigation of the subject of fish poisons, so the matter was left open until the arrival of Mr. Seal, of the United States Fish Commission, who was kind enough to cooperate with this bureau in this important investigation. The following are the names of the poisonous varieties found:

Scientific name.	Native name.	English name.
Spheroides lunaris	Botiti	Puffer.
Spheroides ocellatus	do	Do.
Alutera monoceros	Pacol	Filefish.
Tetrodon immaculatus	Boteteng Saguing	Tetrodon.
Zonogobius semifasciatus[a]	Biat	Goby.
Triacanthus brevirostris	Saltan	Hornfish.

[a] This species is the only poisonous one. There are many species of good biat sold in the market.

These fish are actively poisonous. The natives, especially if weak and diseased, after eating of them are taken with gradually increasing vomiting, diarrhea, muscular weakness, cold extremities, followed by profound prostration and coma, which, unless actively treated, terminate fatally.

The bureau of health immediately prohibited the sale of these poisonous varieties of fish, since which time the number of the cholera-form cases has greatly diminished.

These fish were known among the fishermen and by many natives to be poisonous, but the commercial instinct was so strong as to induce them to mix the poisonous fish with the wholesome varieties and thus find a market for what otherwise would be an unprofitable product.

As the ratio of the severity of the symptoms is directly proportioned to the amount of poison ingested and the sale of fish so enormous, it was very easy by this process of "mixing" to get rid of hundreds of poisonous fish every day without producing fatalities.

This country is signally blessed in its natural resources. Nature has abundantly supplied it with food, but it remains for those intrusted with sanitary matters to maintain a watchful care over these bountiful supplies and to keep them pure and wholesome in order to protect the public health.

PROVINCIAL MARKETS.

One of the principal sources of municipal revenue is the local market, and until the passage of the district health officer's act the question of sanitation had never been associated with this institution. Markets were places where people could go and sell whatever they pleased and in any manner they pleased, so long as they paid their licenses. The provincial supervisor was the provincial sanitary inspector, but the multiplicity of duties claiming his attention prevented his visiting the remote municipalities oftener than once a year. It was an easy matter to make a show of cleanliness when he was there and to lapse into their old habits when he was gone. Under the new system the sanitary conditions are required to be reported on by the local health officer. These reports are verified as frequently as possible by visits from the district health officer. The improvement has been marked, and the sanitary concept is steadily gaining ground. They are required to keep their perishable foodstuffs covered so as to protect them from the flies, which they have learned to recognize as carriers of disease germs. These little points in sanitation are being continually impressed upon the people, perhaps to the point of exaggeration, but these concepts, however imperfectly grasped, are far superior to the old opinions of disease being due to evil-minded persons, to the visits of black dogs during the hours of midnight, and to bad air in the different organs of the body. Even yet an occasional

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cause of death will be registered as air on the brain, or some other impossible cause equally ridiculous. The word "infecion" is now as frequently seen on death certificates as was formerly the word "calentura" (fever). In other words, the knowledge of the germ origin of disease is gradually becoming known. In all of its writings and publications which are sent to the provinces this office avoids the term "germ theory," for the reason that there no longer can be a "germ theory" now that the germ origin of disease is a recognized potent fact no longer to be disputed.

AMBULANCE SERVICE.

The reform in the ambulance service spoken of in the last year's report has been proved a success in a financial way as well as in convenience. The service has gained in promptness, although the reckless speed has been reduced to the limits of safety and common sense, the apparent loss being compensated for in the system of quick responses which has been inaugurated. This speed question has been subject to much discussion in the United States, and artists have caricatured it in the comic papers and in some of the more respectable magazines. The effect has been to arouse the public interest in the danger of this form of reckless driving, which under the pretext of rescuing the wounded criminally disregarded the safety of all whose business brought them in the way.

The department of sanitation and transportation, under which the service is conducted, has made several improvements during the year; the old Civil Hospital ambulance has been repaired and modernized and all the ambulances bought from the Army have been fitted with rubber tires, so that patients can be removed with ease and comfort. The credit for these improvements is due to Mr. Meham, the chief of the department of sanitation and transportation of the municipal government.

MATERNITY HOSPITAL.

The Methodist Church has completed arrangements for the establishment of a maternity hospital in Tondo. They already have a dispensary in operation and a physician and trained nurse at work among the Filipinos.

CARE OF THE HOMELESS.

The bureau of health maintains by contract a number of aged and homeless people. There is not an almshouse or a poorhouse in the entire Philippine Islands. The Spanish Government and the Roman Church taught the people that it was a sacred duty to take care of their relatives and friends, especially in old age. These worthy teachings have had a profound influence in the transformation of the native character, and it is hoped that the Filipino people may never be educated out of these beautiful ideas.

The average number of indigents maintained at the Hospicio de San Jose at government expense are 89 male insane, 104 female insane, 10 infirm aged males, 40 infirm aged females, 41 young males, 98 young females, or a total of 382.

MARKETS IN MANILA.

The entire management of the markets in Manila has heretofore been under the department of assessments and collections, but will shortly be transferred to the department of sanitation and transportation. On November 1, 1906, the work of market sanitation was transferred to the latter department and two markets selected for trial measures.

Divisoria market, in Tondo, one of the largest markets in Manila—in fact, one of the largest in the Orient—had for a long time been in an unsatisfactory sanitary condition. Chinese venders, with commendable appreciation of the value of space, had built additions to their stalls until the market presented the appearance of a number of boxes piled one on the other. Under each stall table was a box which had long ceased to serve any purpose, except to hide filth and afford a breeding place for vermin. The Quinta market, in Quiapo, another large market, while not quite so filthy as the Divisoria market, was also in a very unsatisfactory condition when turned over to the department of sanitation and transportation for trial treatment. The new management began its campaign of reform by causing to be removed from the market all structures and fixtures which in any way served other than legitimate market purposes. Cages and platforms erected were removed, so as to admit air and light. The drawers and boxes fastened under the tables were taken out, and every structure or contrivance capable of hiding dirt was removed. At the time the venders went on a strike on account of a change in the rent for space an excellent opportunity was afforded to carry on the sanitary work inaugurated, and by the time they returned the markets had undergone a complete transformation.

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Tables which can be tilted have been installed, so that the entire markets may now be flushed with ease with a fire hose. Considerable improvement has been made in the design for fish tables, so that this business can be handled in a much more cleanly manner. One very undesirable feature, however, yet remains, and that is the practice of renting space in a building which was expressly designed for the sale of perishable products to dry goods merchants, shoe stores, etc.

The chief of the department of sanitation and transportation modestly refers to the markets in his report to the municipal board in the following language:

"The sanitation of various markets was assigned to this department on November 1, 1906. Believing that the food supply of the inhabitants of a tropical city is one of the greatest sources of disease, every effort was made by this department to eliminate, as far as possible, without prejudicing greatly the interests of the market vendors, any insanitary habits or customs which were found to exist."

The improvement in the markets is very gratifying to this bureau and removes a cause of danger and worry. Fresh air, sunlight, water, and vigilance will accomplish wonders in markets as well as elsewhere.

BUREAU ORGANIZATION V. BOARD ORGANIZATION.

There is now on hand the experience and records of one complete year of bureau organization, and it is possible to compare the results with those of board organization. A careful study of the financial statistics will show that more has been accomplished during the past year for a given amount of money spent than at any time heretofore in the history of the health department of the government. It it believed that by doing away with the obstacles caused by unnecessary loss of time due to having a board to convene, lack of quorums, inability to act quickly, the impossibility to take advantage promptly of opportunities that arise, more than offset the greater representation which is given by board deliberations. As a matter of fact, there is probably more consultation with the different divisions of the bureau at the present time than there was at any time during the existence of the board of health. By consultation with the persons most interested and affected by any contemplated action it gives greater representation than heretofore has been the case and, finally, it is a much simpler matter for those who are in authority quickly to fix the blame for any shortcoming in the administration of the bureau.

CEMETERIES.

Probably no duty which the director of health has been called upon to perform has been more trying and exacting than the question of attempting to carry out the provisions of act No. 1458 with regard to the regulation of cemeteries throughout the islands. It requires an amount of time and attention which is out of all proportion to the good which can be reasonably hoped for. The questions which this office has been called upon to decide have not been so much questions of sanitation as they were differences of opinion, which in all probability had nothing to do with cemeteries, but were expressions of animosity, which were injected into reports of cemeteries with the hope that some action would be taken by this office which would be to the disadvantage of the opposing faction. On account of the foregoing the greatest difficulty has been experienced in obtaining a statement of fact in each case and the difficulty of arriving at a just decision correspondingly increased. Naturally no matter which way the decision went in a given case one or the other faction was disgruntled. This is deeply regretted, because it makes many enemies to the cause of sanitation and many projects which are of greater importance from a health standpoint than cemeteries will be defeated by the enemies thus made.

The law requires that this office shall not only approve all new cemeteries before they can be legally opened, but that all old cemeteries must be approved before they can legally continue in use as burial grounds. In order that the work might be accomplished quickly and as systematically as possible, cemeteries were taken up by provinces and district health officers were instructed to visit every cemetery in their district and furnish answers to the following questions.[a]

So far the work of inspecting the cemeteries systematically in the provinces of Isabela, Cagayan, Ilocos Norte, Ilocos Sur, Bataan, Pangasinan, Tarlac, Nueva Ecija, Bulacan, Rizal, Cavite, Tayabas, Albay, Ambos Camarines, Capiz, and Occidental Negros is well under way and some cemeteries have been passed upon in every province in the islands. In all there were 582 cemeteries inspected, of which number 272 were approved, 156 rejected, and as to the balance decision is pending.

In view of the fact that this work entails an enormous amount of time and clerical work, it will still be several years, with the present office force, before all the cemeteries can be passed upon.

[a] Omitted, and on file in the Bureau of Insular Affairs, War Department.

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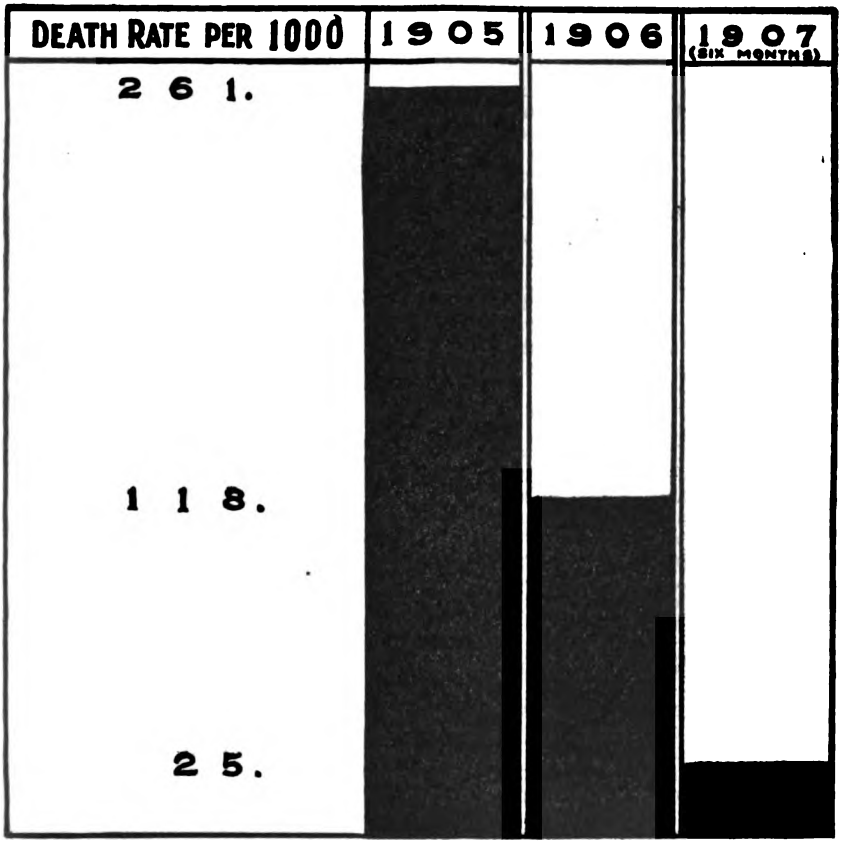
CIVIL SERVICE PHYSICAL EXAMINATIONS.

Since the abolition of the position of police surgeon and the taking over of the work by the bureau of health the physical examinations required by the civil service bureau for entrance into the government service are made at the central office. The positions for which examinations are required include those of the fire department, police department, Bilibid guard service, light-house service, and special service. Applicants are examined with reference to their present condition and their previous history. The special senses are tested and the condition of the lungs carefully examined. Laboratory tests are often made in case of doubt. This work requires considerable time, because it would be absolutely worthless if it were imperfectly done.



IMPROVEMENT MADE AT THE IWAHIG PENAL SETTLEMENT.

Probably modern sanitary science has no greater victory to its credit than the eradication of malaria from the Iwahig penal settlement, in Palawan. This site was chosen by the Spaniards many years ago, but, finally, had to be abondoned on account of the pernicious malarial fever which prevailed there. Soon after the inauguration of civil government the site was again selected for the establishment of a penal colony, but satisfactory sanitary arrangements were not made and the health of the prisoners left much to be desired. In 1906 the bureau of health was placed in charge of the sanitation of the colony, and the health conditions since that date are shown in the accompanying diagram.

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MOSQUITO EXTERMINATION.

During the year not much work has been attempted in eradicating mosquitoes, for the reason that heretofore the efforts have not met with much success, and it was felt that unless mosquitoes could be economically exterminated from a well-paved section of Manila, like the walled city, that a campaign of general mosquito extermination throughout the islands would not be practicable. Therefore considerable time and attention was given to the study of the problem as to why the efforts in Manila have heretofore been unsuccessful.

An entomologist of the bureau of science examined into existing conditions and made reports and recommendations which gave promise of accomplishing the result hoped for. The suggestions were faithfully carried out, but the mosquito continued his strenuous life and it is only recently that a satisfactory explanation has been found. The extensive excavations which were made for the purpose of installing the new sewer system gave an opportunity to examine many of the old Spanish sewers which were opened during the course of the excavations. It had been observed that at certain seasons, and especially during the dry season, the walled city suffered most from mosquitoes. It was found that the trouble was due to the slow velocity of the water in the storm sewers. In the rainy season, contrary to expectations, the walled city is almost entirely free from mosquitoes. This is explained by the fact that large quantities of water pass through the sewers at this time of the year, and the velocity of the water is such that mosquitoes are unable to breed, whereas in the dry season, no water entering the sewers, the current becomes more and more sluggish until finally the flow ceases altogether and only a series of pools remain, due to the inequality of the levels of the bottom of the sewers. This has, no doubt, been brought about by the frequent earthquakes which have taken place in the city. Such places offer excellent breeding places for mosquitoes, in fact large numbers of wigglers were actually found. Many of these sewers will be replaced by cement drains, which will have better grades, and much relief may be expected in the near future. It is proposed during the next dry season to request the city fire department to flush the storm sewers from time to time and thus obviate the difficulty.

From the foregoing it may be seen that after all there was nothing peculiar about mosquito extermination in the Philippines, and from now on this work will be vigorously pushed, especially in the malarial districts.

NEW SEWER SYSTEM.

Although the construction of a new sewer system for Manila was definitely arranged for a number of years ago, yet it was not until this fiscal year that the work of construction was actually begun. The time now appears to be near at hand when the noisome wagons and the primitive methods in general for the disposal of the major portion of the sewage of the city of Manila will be a thing of the past. The septic-tank system, which has been so largely used in the city and which has proven so very satisfactory, after all has only taken care of a small percentage of the total sewage.

During the year over 14 miles of sewer conduits have actually been laid, and when it is remembered that this included the greater portion of the larger size sewers it will be seen that even much more mileage may be expected during the coming year when the smaller sizes are laid. In all 52 miles of street sewers have been contracted for.

With the completion of the new water-supply system, and the complete installation of a new sewage system, the future improvement in the health conditions of Manila should be even more rapid than they have been in the past, because then it will not be necessary to struggle against the tremendous odds which have confronted the work of the bureau of health in the past.

HEALTH RESORTS.

The Philippine Islands is a land unusually well provided with thermal and mineral springs and attractive regions with high altitudes, at which a complete change may be had. In nearly every province spots can be found that may truly be called natural health resorts, and visitors to many of them are unquestionably cured of their ailments or greatly benefited in health.

These places are not frequented to any extent by the American or European population, except Baguio, Los Baños, and Sebul Springs, which rank in importance in the order in which they are named. Baguio, although only 130 miles from Manila, is meteorologically in another and different world. Here the health seeker will find every natural condition he can possibly desire. As the islands are developed, Baguio is bound to become a great sanitarium center. The civil government has maintained

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a sanitarium there for more than five years, and the numbers who avail themselves of the advantages offered have increased each year, the increase being particularly notable during the period covered by this report. The Benguet climate is very favorable for neurasthenic troubles and for the convalescent period of exhausting diseases. Patients suffering from dysentery usually show marked improvement from the first, and rapidly regain their normal condition. This is observed also in nearly all cases of health impairment due to overwork or mental strain. The Army has already established a convalescent hospital, and the demand on it is so great that negotiations have been completed for the erection of another with three times the capacity of the first. The Navy also has taken the matter up, and a report of a special committee recommending the erection of a hospital has been forwarded to Washington. The coming year will probably witness the completion of this hospital, thus bringing the number up to three and this, too, before the establishment of railroad communication.

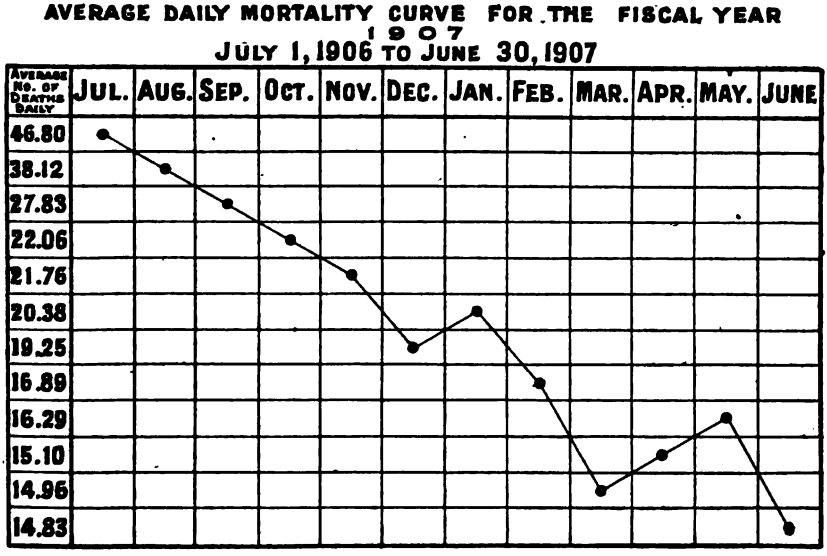
Los Baños is a beautiful resort situated on Laguna de Bay, a few hours' trip by river steamer from Manila, and is renowned for its thermal springs. Excellent results are obtained in specific diseases and in rheumatic conditions.

Sebul Springs, in Bulacan Province, is an old Spanish resort and still maintains its reputation, especially with the older inhabitants. It is understood that a company is now perfecting arrangements to establish a large hotel at this point.

These places will be important centers just as soon as railway facilities are provided.

DECLINE IN DEATH RATE.

The accompanying chart shows in a most striking manner the steady decline which took place in the average number of daily deaths by months in the city of Manila for the fiscal year just ended.



TRAINING SCHOOLS FOR FILIPINO NURSES.

The bureau of health has entered into a cooperative arrangement with the bureau of education to train young Filipino women who have the adaptability and desire to become nurses, so that they may become qualified to take the places in the hospitals. Some of them show a decided talent in this direction. The Commission has appropriated funds which are to be used for granting a free scholarship to one person from each province. In addition several commercial firms have defrayed the expense of additional scholarships. The plan is to give the girls a two years' course under the supervision of a graduate trained nurse. Special attention is to be given to such features of general education as will be most needful in the study of nursing and also to the domestic science training. The course will be largely practical and to this end a small hospital ward has been provided which draws its patients from the hundred or more inmates of the girls' dormitory. This course is to be only preliminary and the

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regular training will be completed in the new general hospital which is to be erected in the near future.

Nursing has undergone a process of evolution and the graduate nurse of to-day is quite a different person from the nurse of twenty or thirty years ago. In days gone by physicians and surgeons never required of a nurse what is expected to-day. Recent years have brought about changes in the methods of diagnoses, treatment, and prevention of diseases. Asepsis alone has revolutionized surgery, but asepsis without a trained nurse to carry it out is impracticable. The preparation, sterilization, and use of the different surgical materials give scope for a display of much intelligence, ingenuity, and resourceful economy. A trained nurse must necessarily know something of bacteriology and pathology in order to carry out the physician's instructions with regard to asepsis and to detect the danger signs in disease. They must understand the art and science of infant feeding and know how to prepare infant foods. It would perhaps not be going too far to say that the lack of local trained nurses is one of the principal indirect factors in the high rate of infant mortality in the Philippine Islands.

The crusade against tuberculosis could be undertaken with more hope of success if Filipina trained nurses were available to instruct the people in their homes regarding the means by which the disease may be prevented.

The nurse is indispensable in settlement work, in district nursing, in public-school sanitation, in tenement-house inspection, and along other lines which it is desirable to instruct people in their homes.

It has been truthfully said that in no other vocation does the true woman show more of beauty and dignity of labor than in nursing. Correct theory and scientific accuracy in general principles and minute details are both desirable, but the true nurse must possess those womanly graces of tactfulness, sympathy, and unselfish devotion to her calling. Skill comes by doing, knowledge comes by study, but the higher attributes come only through careful training and inheritance.

STREET SWEEPINGS AS FILLING MATERIAL.

During the year the use of street sweepings for the purpose of filling in low lands has been frequently permitted whenever it could be done under proper supervision. It is conceded from the outset that the use of this material is not desirable, but the sanitarian in Manila finds himself confronted with this problem; vast areas of the city being at or below the level of high tide, is it better to permit these swampy sections to exist until good filling material can be obtained, which at best will be many years or is it better to put up with a slight nuisance which at most will not persist more than a few weeks and have land at once which drains well and has the other advantages of high ground? Of the two evils the latter has been chosen, with the result that areas of many acres now exist where only filthy swamps were found before. Experience has shown that if the dumpings of street sweepings are promptly covered with good clean earth to a depth of 10 centimeters or more no nuisance is caused. In several instances where this was not done promptly the sweepings made an admirable breeding ground and a veritable plague of flies resulted, the undesirability of which, especially in times of cholera, need not be dwelt upon.

STATISTICAL DIVISION.

For a number of years past it has been the aim to prepare a complete statistical report which would include all the provinces and considerable effort has been made to bring about this result, but thus far without success. The obstacles which have constantly arisen have been of such nature as to prevent the accomplishment of the plan, and the fulfillment of this duty must be left to the future.

The number of births registered during the fiscal year were 7,136, or a birth rate of 31.92 per thousand inhabitants. They will be found classified by sexes, nationalities, legitimates, and illegitimates in a table appended hereto.[a] It is believed that the total of 7,136 is really lower than the actual number of births, for the reason that a part of the population, fortunately a small number, still remains loath or indifferent to comply with the law. This belief is based upon the fact that new births are being registered even at the present time by the health stations when the death certificates are presented for approval previous to the issuance of burial permits by the central office, of young children who have not before been reported. It must be mentioned, however. that this tendency is gradually diminishing.

The average 31.92 per thousand expresses what is known as the simple birth rate in the method now universally used for calculating the birth and marriage rates. A

[a] Some of these figures have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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different method has been devised by certain statisticians to obtain the accurate birth rate of a given community, which is to compare the number of born legitimate children with the number of married women under 45 years of age and the number of illegitimate children with the unmarried women under 45 years. These are factors which can not be disregarded and are necessary when an exact computation of the birth rate is desired.

Eight thousand five hundred and seventy-one deaths were registered, of which 8,251 were residents, or a death rate of 36.91, and 230 transients. The rate of this year has been lower than that of any of the three preceding fiscal years—that of 1903–4 was 49.01; 1904–5, 40.58; and 1905–6, 40.99. Classified by sexes, the total is subdivided into 4,832 males and 3,739 females. According to the census taken at the beginning of this year, the population of Manila is composed of 130,421 males and 93,121 females; the respective death rates therefore by sexes would be 37.04 and 40.15. The high mortality prevailing among the females may be explained as especially due to the fact that there were 97 deaths registered as due to puerperal troubles, a condition of course not found in the males.

Classifying the deaths by ages, we find that there were 891 deaths among children under 30 days of age, 2,167 among those between 30 days and 1 year, and 1,422 between 1 year and 5 years. The deaths among these three groups of ages combined were 52.26 per cent of the total number of deaths, the first group alone representing 10.39 per cent, the second 25.28, and the third 16.59. Among those who died at the age of 90 years and over the death rate was 0.38 per thousand population.

The following table shows the oscillations observed in the infant mortality during the twelve months:

	Under 30 days.	30 days to 1 year.	1 to 2 years.
1906.			
July	5.88	21.65	13.63
August	6.79	24.14	10.55
September	8.62	29.52	7.80
October	13.49	28.96	5.39
November	14.24	27.00	3.70
December	16.29	26.99	4.63
1907.			
January	11.93	28.85	5.58
February	12.87	25.75	4.22
March	12.08	24.16	4.79
April	12.46	25.86	6.46
May	9.07	21.16	7.45
June	12.52	22.45	9.21
Total average for the year	10.39	25.28	7.89

Classified by groups of causes, the deaths were as follows:

	Males.	Females.
General diseases	1,981	1,324
Diseases of the nervous system	1,148	940
Disease of the circulatory system	141	77
Diseases of the digestive system	544	453
Diseases of the genito-urinary system	95	84
Puerperal diseases	.....	97
Diseases of the skin and cellular tissue	8	.....
Diseases of the organs of locomotion	7	4
Congenital malformations	5	1
Diseases of the early infancy	248	199
Senility	75	137
External causes	86	23
Undetermined causes	44	20
Total	4,832	3,739

For the purpose of completing the study of all the factors which have an influence upon the movement of the population of the city, and as one of them is the number of marriages solemnized and this information is not obtained by the bureau at the present time, a deduction will be made from other more accessible data, viz, as the number of mothers who have borne children for the first time during the year, from which an approximate average of 8.57 per thousand inhabitants is obtained.

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The following provincial table is believed to be only approximately correct and it should not be used for drawing deductions: [a]

CIVIL HOSPITAL DIVISION.

The amount of suffering and distress which has been relieved at this government institution during the year can scarcely be realized by persons who have not had occasion to visit the hospital from time to time. Not only have all government employees received medical care, but many persons outside of the government service, on account of the meager hospital facilities in Manila, have enjoyed its advantages. Although the buildings used by this division are entirely unsuited for hospital purposes, the painstaking care of the medical and nursing staff has done much to overcome this shortcoming. There are more highly trained nurses on duty at the civil hospital than at any hospital in the Orient, so that the employee who falls ill at least has the assurance and satisfaction of knowing that he works for a government that has provided facilities for his care which are far above the average.

The results of the treatment of patients have been very satisfactory. There were 1,310 patients treated, of whom 818 were white, 463 Filipinos, and 29 Chinese, Japanese, and other Asiatics. Of this number only 29 deaths occurred, 3 being patients of outside physicians. As 8 of the deaths were those of patients brought to the hospital in a moribund condition, they may be properly excluded from the number of deaths in the institution. On this basis, the death rate would be less than 1½ per cent of the cases treated.

The number of prescriptions filled and refilled in the hospital dispensary was over 8,000, and the number of dressings applied in the operating and dressing rooms was nearly 11,000.

About 1,000 minor operations were performed upon outdoor patients who presented themselves for treatment.

The efficiency of the hospital is considerably embarrassed by lack of suitable quarters. It is hoped that the annual report for the next year may record the assured fact of the long hoped for general hospital of Manila.

Elsewhere will be found a report in detail showing the number of patients treated and with a record of the diseases and mortality.[b]

BILIBID SANITATION.

The high death rate in Bilibid prison was a source of mortification to the bureau of health long before it took over the medical and sanitary work of the prison. One of the first moves after assuming this work was to improve the sanitary condition by admitting light and air and to relieve the overcrowding which was believed to be an important factor in the excessive mortality. The death rate was 123 per thousand when the bureau of health took charge. A number of structural improvements have been made, all the drains have been deepened and made semicircular, the level of the ground has been raised, and a system of daily sprinkling instituted. Drinking-water barrels were provided with locked covers to guard against contamination. Rigid inspections were made of all latrines. Prisoners who were sick were encouraged to come into the hospital upon the appearance of their first symptoms. Some months after the introduction of these immediate measures it was reduced to an average of about 75 per thousand and here it remained; it seemed impossible to get it any lower. Like everything else, there was a reason for this. The prisoners were dying with ailments that should not have killed them; their powers of resistance were evidently impaired. The habits and customs of the people with reference to eating immediately suggested a clue and a remedy. The clue pointed to some extraordinary drain on the system. There was plenty of food but imperfect nourishment. To discover the cause, a routine practice was inaugurated and the feces of every prisoner in the prison was examined for the presence of ova of intestinal parasites. These were found to be present in about 60 per cent of all cases examined. Active therapeutic measures were inaugurated to rid the patients of the causes of these debilitating troubles and the result was immediately satisfactory; the death rate fell to about 20 per thousand.

The prevailing diseases treated in Hospital "A," Bilibid prison, were: Ankylostoma, 1,537 cases; amœbic dysentery, 551 cases; acute dysentery, 174 cases; cholera, 18 cases; pneumonia, 62 cases; beri-beri, 60 cases; conjunctivitis, 221 cases, and malaria, 174 cases.

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[a] Omitted and on file in the Bureau of Insular Affairs, War Department.

[b] The statistics in the appendix to this report have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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During the previous year only 39 cases of ankylostomiasis were treated, as compared with 1,537 cases during the present year. There have been 551 cases of amœbic dysentery treated, as against 111 cases for the preceding year. These figures do not by any means indicate a greater prevalence of this disease and may be explained on the ground that they were detected by the systematic stool examinations which have been practiced. Among the rarer parasites that have been found are: Paragonimus westermanii, 9 cases; schistosoma japonicum, 15 cases; opisthorchis sinensis, 5 cases; balantidium coli, 14 cases; tenia saginata, 20 cases; tenia solium, 2 cases, and tenia nana, 3 cases.

Plans have been drawn for a new sewer system and for new sanitary beds; these improvements, when installed, will further reduce the death rate.

Work will soon be begun upon a new prison hospital, which is greatly needed. With this new building and the completion of the improvements already in progress and a continuance of the same competent medical supervision, there is no reason why Bilibid should not be made the healthiest prison in the Orient.

Every new patient is subject to a routine treatment before he is assigned to a brigade. If these measures could be carried out throughout the city generally, it is believed that the infant mortality would be greatly reduced. Of course, in the very young infants intestinal parasites would not be found, but they suffer nevertheless indirectly from them because of the impoverished condition of their mothers on whom they rely for support. If this office were asked to give the most common affliction of the natives of the Philippines it would unhesitatingly name intestinal parasites.

BENGUET SANITARIUM DIVISION.

The erection of two sawmills, the installation of additional mining plants, the increase in road work, have contributed the usual percentage of accidents and other sickness, which, added to the steady increase in the medical work caused by the constantly augmenting number of visitors to Baguio, have increased the amount of work to be done in the hospital at a much more rapid rate than heretofore has been the case. In addition to the foregoing, the Igorots have taken more kindly to hospital treatment, and their sick and injured have been brought for many miles around to the hospital at Baguio.

The prescriptions filled at the pharmacy show an increase of 55.29 per cent, or 710 more prescriptions filled than last year, which alone is an indication of the growth of the medical work.

Eighty cases of malarial fever were treated at the hospital and the results were uniformly satisfactory, much more so than those cases which are ordinarily treated at lower altitudes. All of these patients came from the lowlands, none of them originating in altitudes as high as that in which the sanitarium is located. The mosquito transmission of malaria theory receives further confirmation in the experience at Baguio, because no anopheles mosquitoes are found there.

The treatment of amœbic dysentery at the hospital met with the same excellent results that were obtained in years past. It has been proved beyond question that frequently a trip to Japan or to the United States can be avoided when this malady resists ordinary methods of treatment in the lowlands.

In addition to the routine work connected with the administration of the hospital and the treatment of the sick, the medical officer in charge, in his capacity as sanitary officer of the province, made many trips of inspection to markets, mining camps, water supplies, etc., and gave the necessary directions for maintaining them in proper condition.

One case of cholera was imported into Baguio, but was so promptly handled that no further spread of the disease took place. An outbreak of smallpox which occurred along the Benguet road was quickly suppressed and practically no spread took place from the time the original cases were discovered.

The work of the division has been seriously handicapped by the poor buildings which had to be used for hospital purposes during the year. It will be remembered that the former sanitarium building was transferred to private persons for hotel purposes and only two cottages remained in which to conduct the hospital work. The appropriation for the new hospital was not made as quickly as anticipated, thus giving rise to great inconvenience and lack of facilities for doing the work properly. This omission has, however, now been supplied, the Commission having appropriated ₱50,000 for the construction of a hospital which, it is thought, will meet all demands which may be made upon it for some years to come. An excellent site has been chosen and it is hoped that within six months the new building will be ready for occupancy.

There were 26 Americans, 2 Europeans, 189 Filipinos, and 48 Japanese, making a total of 264 patients, treated in the hospital, which is an increase of 113 patients, or

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nearly 76 per cent over last year. The number of surgical cases treated was 43. an increase of nearly 54 per cent over last year. The number of outdoor patients, mostly Igorots, was 1,371, an increase of over 129 per cent.

The meteorological advantages of Baguio have been spoken of elsewhere. The warmest day of the year was on May 5, when the temperature was 26 centigrade (79½° Fahrenheit), and the coldest was on January 9, when the temperature was 4.4 centigrade (40° Fahrenheit). The highest monthly average or mean temperature was recorded in June, 23 centigrade (73.62° Fahrenheit), and the lowest monthly mean temperature was recorded in the month of February, 9.25 centigrade (48.58° Fahrenheit).

CULION LEPER COLONY.

Mortality.—At the present time there are 739 lepers at the Culion leper colony. The mortality during the year has been high, which may be ascribed to the miserable physical condition in which the lepers were found at the time they were gathered from their respective provinces. The great majority of them were beggars who eked out a miserable existence begging on the streets, from house to house, or existing on such charity as might be bestowed upon them. Large numbers of them suffered from gangrenous ulcers. Before their arrival at Culion, a number of them were afflicted with beri-beri, and the weakened condition in which many of the others were found made them ready prey to this disease. It is not believed, however, that the transfer of the lepers to Culion in any way hastened their end, but rather, that life was prolonged in many instances owing to the medical attention given and the excellent food which is furnished. It was simply a question of the survival of the fittest and among those remaining in this group death is comparatively infrequent. They are healthier, stouter, and generally more robust than when they were received, and many of them bid fair to live a long time. The deaths, by months, were as follows:

1906.		1907.	
July	45	January	23
August	48	February	12
September	39	March	13
October	26	April	19
November	36	May	17
December	36	June	23

Thus, for the first six months there were 230 deaths and for the last half of the year, 107. In view of the fact that the colony during the latter portion of this period had almost double the population it had during the commencement of the year, the great reduction in the death rate will be apparent.

Practically all gangrenous ulcers, by proper medical attention, have healed and the number in the hospital from other causes has been gradually reduced. The deaths among the lepers were due principally to gangrenous septicæmia, beri-beri, tuberculosis, or general debility.

On February 28 a mild case of smallpox attacked a young girl of the colony. Isolalation and quarantine were maintained for a month, subsequent to disinfection. Vaccination of all the lepers of the colony and also of the nonleper employees was performed, with the gratifying result that no other cases developed, which fact again speaks for the efficiency of vaccination as a preventative of smallpox. In this case, it is quite interesting to note the result of the vaccinations. In the lepers we had practically virgin soil; some had been vaccinated during the Spanish régime, but the majority had not. Many adult lepers had not been vaccinated because of the very fact that they were lepers, and also leprous children were passed for the same reason by provincial vaccinators. Thus, with good fresh virus it was interesting to watch results and compare the percentage of takes in the lepers under these conditions, and of the nonlepers, employees, among whom there were many laborers who had never been vaccinated. The number of takes among the lepers was as large as that in healthy subjects and in no particular could it be said that leprosy modified the effect of the vaccination.

The source of infection in this one case is not quite clear. None of the lepers had come in contact with persons from the outside world for several months. It is believed that the contagion came in some textiles which were sent to Culion by friends residing in infected districts.

Discipline.—The behavior of the lepers has been good. Among the 1,000 inmates during the year, but one serious offense was committed and that was on the day of admission, which was November 1, 1906; a man stabbed his wife three times with a bolo, but though the wounds were of a grave character she eventually recovered and her

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husband was sentenced to six months' imprisonment and to be deprived of his gratuity indefinitely. A few minor offenses have occurred and suitable punishment administered. Eighteen lepers at various times have attempted to escape. All but three have returned or been returned. Two groups of five each succeeded in reaching Cuyo, in a small open boat, but were apprehended by the constabulary and returned on the leper boat.

Subsistence.—The subsistence furnished has been excellent in quantity, quality, and variety. Four beeves were consumed per week, the same being inspected and slaughtered at Balala. Other food consists of rice, mangoes, beans, fideos, salmon, codfish, tomatoes, lard, coffee, sugar, milk, salt, garlic, pepper, vinegar, and fresh fish caught by themselves. The lepers have requested that fresh vegetables be furnished them, but these they might easily raise themselves and probably will do so to a small extent this rainy season. Seeds have been given them and permission to plant at Baldat and Toboc.

Productive labor.—It is very difficult to accomplish any work with the lepers; many are reasonably strong robust persons who, as yet, are able to do considerable work if they wished to do so. It is true that the majority are debilitated, more or less always ill, easily fatigued, and could accomplish nothing; but the majority of those who could work are lazy and indolent, and as long as they are clothed, fed, housed, and receive a weekly gratuity of 20 centavos, from the government, they do not take kindly to any form of manual labor, and it is even with difficulty that the ordinary work of cleaning up their premises is accomplished.

Births.—During this year there have been six children born at the colony, three of whom survive. In four of the cases the mothers were pregnant before arrival at the colony, the other two are Culion children, born out of wedlock. This brings up probably the most difficult problem to handle under the existing conditions—the separation of sexes. There are some 89 houses on the colony of varying accommodations, all located within a radius of some 500 yards, thus bringing the people in close contact nearly all the time. The houses have been numbered and certain ones designated to be occupied by males and others by females, except in the case of a family of different sexes which may be permitted to occupy the same house when it can be satisfactorily arranged. At night the separation is not believed to be satisfactory. The police and others who are depended upon to carry out instructions regarding this matter are but human themselves and can not be depended upon to keep the inmates in their respective quarters.

The missionary work which is done among the lepers by the two members of the Jesuit order and the Sisters of Charity on duty there have no doubt had an excellent effect.

In order to give these unfortunates the greatest measure of liberty, they are permitted to roam about the island at will during the daytime, so that additional opportunities for the meeting of the sexes are possible even though absolute separation could be enforced at night.

The question of the separation of the sexes has received the most serious consideration from the highest to the lowest official who is in any way connected with the care of the lepers in the Philippines and while there is no unanimity, yet the concensus of opinion undoubtedly is, that while the undesirability of the commingling of the sexes is fully appreciated and greatly to be deplored, yet judging from the customs and habits of the people it is thought that the complete separation of the sexes is impracticable, if not impossible. The remedy lies rather in persuasion than in the application of force and it is believed that the former will yield the best results. It is a moral question and since the government of the colony is made to conform as closely as practicable to that of the ordinary Philippine town, it would appear that the management of this question should be left to the persuasive methods of the church.

Children.—It has about been decided to build a suitable house in the nonleprous portion of the colony for the care of such children as are born at the colony, where they would be cared for by the Sisters of Charity.

Improvements.—The regular employees of the colony with practically no outside assistance made many improvements during the year and in consequence the appearance of the colony has been much enhanced.

A fill was made near the quarters of the nonleprous employees, and a large bodega erected thereon. The new gravity water system with its pipe line of more than a mile in length which leads from a reservoir back in the hills has been completed and more water is available for the colony than can possibly be used. A large lighter was built for unloading freight. The construction of steps and proper walks is well under way. A house for the assistant physician is under construction. All buildings have been repaired where necessary. The nipa houses used by the lepers are being repaired

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by themselves with nipa which was furnished them. Changes were made in some of the water-closets. Considerable painting and whitewashing was accomplished.

During the coming year, it is proposed to build an addition to the hospital and to erect another bodega so that the buildings which are now used for that purpose may be used for living quarters for lepers. The construction of nipa houses will be steadily continued. Plans for a new building for nonleprous children are now being prepared.

SAN LAZARO HOSPITALS DIVISION.

This division comprises the smallpox, plague, cholera, and leper hospitals, the hospital for the insane, the morgue, and the crematory. In all of its hospital departments 488 patients have been admitted during the year, 308 of whom were remaining on June 30. One of the principal benefits accruing from conducting these different institutions under one management is economy. The daily cost of subsistence for the year has averaged about 34 centavos Philippine currency, which, considering the character of the food which has been provided, is remarkably low.

Insane department.—The insane department has been somewhat overcrowded, but in January of the present year the construction of a new ward, which will accommodate 250, was begun. It is now almost completed and will be ready for the reception of patients August 15. The new building is of reenforced concrete, and is practically fire and earthquake proof. With this increase in the facilities of the dapartment, accommodations for 350 insane persons will be available. The male inmates have been occupied a portion of the time in cultivating vegetables, and the female inmates have rendered much assistance in doing much of the sewing that is required for the different divisions of the bureau. The majority of the males do not take very kindly to physical work and much persuasion is often necessary.

Leper department.—At the close of the fiscal year there were 129 male and 87 female lepers remaining in the hospital, and a happier and more contented lot, so far as lepers go, could not be found anywhere.

A new X-ray apparatus of the latest design has been installed, and by its mere presence alone has done much to make the lepers better satisfied, because they feel that efforts are at least being made to cure them of a disease that has been considered incurable heretofore.

With the kind gift of a Spanish resident, instruments were purchased and a leper orchestra was organized, which furnished considerable diversion for a time, but unfortunately the fingers of the players soon became so abraided and sore that the string instruments had to be discontinued.

Cholera, plague, and smallpox departments.—The plague and smallpox wards have been very little used. The cholera ward has practically been closed since October of last year. At the close of the fiscal year these three wards were empty.

Morgue.—During the period covered by this report, 835 bodies have passed through the morgue, most of them being sent there to be buried free of charge as pauper patients by the city. It is now the practice not to cremate except when requested, owing to the opposition to this method of disposing of the dead.

(The statistical tables for this division will be found in the appendix.)[a]

CLERICAL DIVISION.

The work of the clerical division was often seriously handicapped during the year owing to the various changes in personnel, the necessity for employing temporary employees to replace those on leave and to the expansion of the bureau.

At the present time among the American employees there are but two in the division who were there at the beginning of the fiscal year, and of those present now, including the chief of the division, none have been employed for a complete year. From the foregoing it may be seen that the experience of this office corresponds closely to that of nearly every bureau of the insular government—increasing difficulty in securing and retaining the services of trained employees. The majority of them resign and return to the United States, where they usually work for lower salaries than are paid here. This question is becoming serious and should receive attention at once.

The law which changed presidents of provincial boards of health and made them district health officers and therefore employees of this bureau occasioned an enormous amount of correspondence; the constant increase in the number of inmates at the Culion leper colony; the passage of the recent act which provides for the consolidation of municipalities into municipal health districts; the changes made in the license law; the several hundred additional vaccinators who were employed during

[a] These have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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the year, a record of each one of whom is kept; the increase in the number of insane at present being cared for by this bureau; the new cemetery law, which provides that every cemetery in the Philippine Islands must be passed upon, and the many other duties which have been added to the bureau of health have placed an enormous amount of additional work upon this division. It is therefore very satisfactory to report that there has been practically no increase in the clerical force, the work being handled by the number of employees who were authorized last year.

It is believed that more overtime work has been done and more accomplished with less employees than was the case in any other bureau of the government.

(The financial statement will be found in the appendix.)

SANITARY ENGINEERING DIVISION.

The work of this division has been considerably interrupted by a change in engineers, Mr. J. D. Fauntleroy having resigned to enter the Reclamation Service of the United States. Practical operations in Manila were suspended almost entirely during the months of December, January, February, and March. In December the energies of the division were directed to closing up the outstanding orders so as to be ready to begin the work of the new year under the sanitary code which had been passed to go into effect on January 1. The other three months' delay was occasioned by the groundless protests against the new legislation. The press had so excited the people that it was deemed best to hold all work in abeyance until they had time enough to see that they were being misled, and the code itself was no stricter than the scattered ordinances which had regulated these matters for many years.

The scope of the work of the sanitary engineering division covers the entire islands and more and more attention is being paid each year to provincial work.

The various styles of septic vaults which have been evolved as a result of the experience gained since the American occupation have now been so perfected and have given such uniform satisfaction that it has been deemed advisable to include in this annual report a drawing of each style. The diagrams and instructions which are sent out to contractors are as follows:[a]

(Statistical tables showing work accomplished in Manila during the year appear in the appendix.)[b]

PROPERTY DIVISION.

Although the demands upon this division have increased enormously, the personnel has remained the same as last year. Property which amounted in value to nearly ₱100,000 was received at the main storeroom and carefully checked upon its receipt, errors were frequently detected and substantial savings made by the business-like manner in which the work was carried out. Subsistence supplies to the amount of ₱144,557.07 were purchased and their delivery supervised in Manila or the shipments made when they were for the provinces. The selection of supplies to the amount of ₱22,407.10 was made and their delivery arranged direct from the warehouse of the seller to the division of this bureau for which they were intended, and when it is remembered that these purchases were largely composed of innumerable small items, like the selection of ligatures, the size of needles, the length of probes, the shape of knives, etc., the painstaking care required will be fully appreciated.

The purchase of supplies through the property division has continued to give most satisfactory results. The experience gained last year, added to the knowledge which has been acquired during the period covered by this report, has enabled the bureau to save thousands of pesos over what has been paid heretofore for similar supplies. The greatest attention is constantly given to prices current in the local market, and when the cost is favorable advantage is taken of such circumstance, and it has happened frequently that the knowledge that this bureau had of low prices was also

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[a] The following diagrams of vaults, with accompanying specifications and instructions as to their construction, have been omitted from this report and are on file in the Bureau of Insular Affairs, War Department:

Tight vault for houses of two or more stories.
Septic discharge vault.
Absorbing basin.
Septic absorbing vault.
Gravel filter discharging catch-basin.
Tight vault without seats.

[b] These have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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furnished to other bureaus, so that the savings made not only accrued to the benefit of this bureau, but were participated in by the government as a whole.

Two million seven hundred and eighty-five thousand four hundred and seventy-five units of vaccine virus were forwarded to the provinces, which were divided into 497 shipments. This work was handled most satisfactorily, and the vaccine reached its destination in better condition and more promptly than has ever been the case heretofore, notwithstanding the fact that more and more inaccessible regions of the Philippines had to be reached during the past year. By keeping a careful supervision over the drug stock on hand, the old stock which was bought years ago has been almost entirely closed out without loss to the government, and the care which has been exercised in only keeping on hand such drugs as are not likely to spoil and for which there is a constant demand also resulted in a material saving.

Four hundred and thirty-six requisitions were filled and forwarded to the provinces and to hospitals and health stations in Manila. One hundred and seventy-six remedy packages, ranging in value from ₱5 to ₱25 were prepared and disposed of as follows:

Sold to individuals or other bureaus	78
Issued to indigent persons	59
Remaining on hand	39

Much time was devoted to the repair and care of public property and many articles made serviceable for a number of years longer on account of having received timely attention.

INSPECTION DIVISION.

This division was nominally organized September 29, 1898, but was restricted in its operations until the dry season of 1901, when it was enlarged solely for the purpose of combating a threatened plague epidemic. Upon the appearance of cholera in April, 1902, it was enormously increased by the employment of a large number of emergency inspectors, about 7,000.

The division now consists of 35 district health officers, of whom 5 are on duty in Manila; 7 sanitary inspectors, of which number 6 are on duty in Manila; 12 assistant sanitary inspectors, all on duty in Manila. The ambulance corps, the municipal pharmacy, and the disinfecting corps are also branches of this division. The municipal sanitary inspectors in the provinces are not included in its personnel, though it exercises indirect control over them.

The passage of the pure food and drugs law and the inspections required by the sanitary code in Manila have greatly increased the duties pertaining to this division, which was already charged by law with making regular inspections of work of municipal boards of health, of the work of all employees of the bureau of health, of the cleaning of the sewers, streets, walks, alleys, public squares, and parks; of the collection and disposition of garbage and dead animals, night soil, and contents of cesspools, and of the sanitation of houses, factories, mills, schools, prisons, dairies, markets, meat shops, bakeries, public water supplies, public bath houses, wells, cisterns, cemeteries, undertaking establishments, asylums, jails and barracks, poorhouses, theaters, and all public institutions and places of public resort.

From the nature of the duties imposed upon this division it will be seen that it is a medium of communication between the public and the administrative direction of the bureau; hence it has been necessary constantly to insist upon the observance of uniform courtesy and forbearance on the part of its employees. The enforcement of health regulations has ever been a source of annoyance to the people, but the success with which this division has avoided serious complications and embarrassments testifies to what may be accomplished by a policy of courtesy and kindness.

In Manila the sanitary inspectors' section of this division made 560,168 inspections of houses during the year, and have caused 82,814 house-cleaning orders to be executed. As a result of these inspections, there were also 36,902 yards and 718 cesspools cleaned. Three hundred and twelve samples of food and drinking water were collected and sent to the laboratory for analysis.

The statistics for many other results accomplished will be found in the appendix, but it is impossible to represent the amount of work performed in figures alone, as a large part of it is of such a nature that no record can be made.[a]

During the year there were 5,331 disinfections made. A disinfection may mean simply a disinfection of the premises or it may mean the disinfection of almost everything found upon the premises, as well as wearing apparel, cooking utensils, bed clothing; in fact, everything that could be the medium of conveying germs of disease.

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[a] These tables have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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THE BOARD OF MEDICAL EXAMINERS.

During the year the board of medical examiners registered 13 doctors of medicine, 6 licentiates of medicine, 27 cirujanos ministrantes, and 2 midwives, making a total of 48. Of this number, 7 doctors of medicine, 5 licentiates of medicine, 22 cirujanos ministrantes, and 7 midwives were registered by examination, and the remainder by reason of having been in the islands prior to the passage of act No. 310.

The total receipts of the board were ₱860 and total expenses ₱356.88, leaving a credit balance of ₱503.12, which was covered into the treasury of the Philippine Islands.

Attention is called to the fact that 27 cirujanos ministrantes or practicantes were registered during the year, while the number of physicians was only 19. A cirujano ministrante is not a physician nor is he a trained nurse, and it is unfortunate that the law gives him a legal status. With two medical colleges in the Philippine Islands, the time has certainly come when he can be eliminated from the field of medicine. Therefore it is recommended that act No. 310 be so amended that the board of medical examiners will not be required to license cirujanos ministrantes in the near future.

Fewer flagrant violations of the medical-practice act have come to notice during this year than in any year since its passage. The board has never been sure of its position with reference to cirujanos ministrantes or undergraduates in medicine. In Spanish times these people acted as assistants to physicians; that is, they acted more or less in the capacity of nurses; not trained nurses, because they never had the training. It is believed that it would be better to let those who have already registered practice as physicians in remote municipalities and discontinue from now on the title of cirujano ministrante, as it is generally called, or practicante in medicine.

THE BOARD OF DENTAL EXAMINERS.

Nineteen meetings were held during the year and six applicants presented themselves for examination, two certificates having been issued to graduates and one to a cirujano ministrante. Among the dentists registered was a graduate of the dental department of the Washington University, St. Louis, who is the first Filipino dentist to graduate from a college in the United States since American occupation. A Filipino member of the board of dental examiners graduated from the University of Pennsylvania before the Spanish-American war and has been practicing continuously in the city of Manila, except during the time he was studying in Paris and other European cities. It is understood that several young Filipinos are studying in American dental colleges and will soon return to the islands to engage in practice.

The board reports that there have been no violations of the dental law during the year of sufficient importance to necessitate prosecution.

There were collected from all sources ₱80 and expended for all purposes ₱344.

BOARD OF PHARMACEUTICAL EXAMINERS.

This board has held two examinations during the year, as required by law, the first on July 3, at which 17 applicants presented themselves, and the other on January 2, when 20 applicants were present, making in all 37 applicants during the year. Out of this number only two were successful, a percentage of a little less than 5½. In explanation of why so few of the applicants were successful in the examination, it may be stated that the requirements of the board, so far as practicable, are made to conform with the standard of American pharmacy and that with most of the candidates the practical experience or the theoretical knowledge was deficient. Those who seemed to have the one lacked the other. The members of the board, two of whom are Filipinos, are to be commended for their efforts to elevate the standard of the profession of pharmacy.

The board issued 37 apprentice certificates and 8 temporary certificates without examination, and collected from all sources the sum of ₱962 and expended for all purposes ₱596, leaving an unexpended balance of ₱366, which has been covered into the treasury.

EXPENDITURES.

At the close of the last fiscal year the unexpended balance from the appropriation for the previous year's current expenses (₱125,487.20) reverted to the treasury. The amount available for expenditure for the fiscal year just closed was ₱1,048,000.

The total expenditures authorized from the current appropriation bills was ₱885,719.24, leaving an estimated balance of ₱163,719.24 which will revert to the treasury.

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These figures are perhaps not absolutely accurate because the cost of supplies yet to arrive from the United States and the amounts of the bills contracted during the latter part of the fiscal year are not yet known and can only be estimated.

(Detailed financial statement will be found in the appendix.)

CONCLUSION.

From a sanitary standpoint the year covered by this report has been a successful one, successful not only because it has been practically free from the devastating influence of epidemic diseases, but because of the progress that has been made along the lines of real, effective sanitation, and the administration has proved sound from a business standpoint. It is believed that the amount spent this year has produced greater results than any similar amount during any year previous. Lives that have been saved if measured in terms of commercial value would reach an enormons amount, but when measured in relation to their value to the body politic, especially when such relation is affected by the conditions of an underpopulated country, the results are beyond human calculation. Heretofore the best efforts of this bureau were necessarily expended on Manila and municipalities, not far removed, but as the work has become more systematized it has become practicable to extend scientific methods of sanitation to the more remote districts. The importance of the work becomes apparent when comparisons are made with nearby oriental countries. The conditions for the spread of plague are as favorable in the Philippine Islands as they are in many parts of India where it is raging with great severity. The inhabitants of the Philippines are no more immune to cholera than are the inhabitants of Bengal. Why is it that the country is not decimated by devastating epidemics of smallpox as are certain parts of China? The only available explanation, so far as this office knows, is that eternal vigilance, which is the price of success, has been observed.

The newspapers are not yet through praising the results gained by the sanitary methods adopted by the American Government in Habana during the early part of the American-Spanish war. These measures were indeed successful and deserve all the compliments they have received, but it should not be forgotten that they were brought about under very favorable auspices; that the country was under military rule and that the orders of the health officer were supported by the prestige of martial law. The Cuban politicians and the opposing press were for the time silent; sanitation was the order of the day and no excuses were taken; no lawyers to contest in court; no restraining orders and no legal obstacles. Large sums of money for sanitary purposes were appropriated in Cuba while in the Philippine Islands only small amounts were available for sanitation. The results here have been brought about on different lines; every effort that has made for progress has been obstructed by meddlesome opposition, and every advance has been sharply contested. Perhaps in the long run it will all be for the best, and the results may be of a more permanent character than if they had been gained with less effort. It has been a campaign of education, patience and persistence.

Reference to the statistical tables in each succeeding annual report, will show a steady decrease in the dangerous communicable diseases since American occupation. While they show the success that has been achieved, they do not record the hard work, the discouragements, the faithfulness and efficiency of those to whom the credit is due—the employees of this bureau—therefore it remains for the director of health publicly to acknowledge their part in bringing about what he believes to be a successful issue.

Very respectfully,

VICTOR G. HEISER,
Passed Assistant Surgeon, United States Public Health and Marine-Hospital Service, Director of Health.

To the SECRETARY OF THE INTERIOR,
Manila, P. I.

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APPENDIX.

STATISTICAL TABLES—BUREAU OF HEALTH.

GENERAL STATISTICS.[a]

Population of the city of Manila.

[Health census of 1907.]

Nationality.	Population.	Nationality.	Population.
Americans	5,199	Chinese	18,028
Filipinos	195,292	All others	1,143
Spaniards	2,903		
Other Europeans	977	Total	223,542

[a] Unless otherwise stated these statistics are for the fiscal year ended June 30, 1907.

Births reported in Manila.[a]

Nationality.	Male.	Female.	Total.	Annual average per 1,000.
Americans	71	56	127	24.42
Filipinos	3,598	3,337	6,935	35.51
Spaniards	16	16	32	11.02
Other Europeans	11	11	22	22.51
Chinese	11	8	19	1.05
All others	1	.....	1	0.87
Total and average	3,708	3,428	7,136	31.92

[a] Incomplete.

Number of deaths and death rate per 1,000 among residents of Manila, by nationalities.

Nationality.	Number of deaths.	Annual average per 1,000.	Nationality.	Number of deaths.	Annual average per 1,000.
Americans	29	5.59	Chinese	329	18.24
Filipinos	7,804	39.96	All others	22	19.24
Spaniards	46	15.84			
Other Europeans	21	21.49	Total and average	8,251	36.91

A classified report of all deaths occurring in Manila, including transients.

Males.	Number.	Females.	Number.
Married	955	Married	806
Divorced	1	Divorced	2
Widowers	312	Widows	546
Single	885	Single	240
Boys	2,585	Girls	2,110
Condition not stated	96	Condition not stated	33
Total	4,834		3,737
Grand total			8,571

Stillbirths	310
Number of deaths with medical attendance	4,865
Number of deaths without medical attendance	3,706
Total	8,571

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Deaths, by age, including transients.

Age.	Number.	Age.	Number.
Under 30 days	891	40 years to 50 years	530
30 days to 1 year	2,167	50 years to 60 years	397
1 year to 2 years	677	60 years to 70 years	294
2 years to 5 years	745	70 years to 80 years	217
5 years to 10 years	212	80 years to 90 years	122
10 years to 15 years	102	90 years to 100 years	49
15 years to 20 years	344	Over 100 years	36
20 years to 25 years	442	Unknown	19
25 years to 30 years	536		
30 years to 40 years	701	Total	8,571

Comparative mortality in Manila from January 1, 1901, to June 30, 1907.

Months.	1901.		1902.		1903.		1904.	
	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.
January	753	[a] 36.25	760	[a] 36.58	602	[a] 28.98	796	[b] 42.64
February	689	[a] 36.72	706	[a] 37.63	511	[a] 27.23	709	[b] 40.59
March	885	[a] 42.66	770	[a] 37.06	539	[a] 25.94	751	[b] 40.23
April	886	[a] 44.07	1,327	[a] 66.01	549	[a] 27.31	748	[b] 41.40
May	903	[a] 43.47	1,688	[a] 81.26	770	[a] 37.06	766	[b] 41.03
June	621	[a] 30.89	1,418	[a] 70.54	592	[a] 29.45	800	[b] 44.28
July	608	[a] 29.27	2,223	[a] 107.02	620	[b] 33.21	866	[b] 46.39
August	702	[a] 33.79	1,712	[a] 82.42	862	[b] 46.17	1,032	[b] 55.28
September	767	[a] 38.15	1,132	[a] 56.31	1,228	[b] 67.97	1,064	[b] 58.89
October	855	[a] 41.16	927	[a] 44.62	1,217	[b] 65.19	1,018	[b] 54.53
November	848	[a] 42.18	1,035	[a] 51.48	974	[b] 63.91	957	[b] 52.97
December	858	[a] 41.30	753	[a] 36.25	894	[b] 47.89	794	[b] 42.53

Months.	1905.		1906.		1907.	
	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.
January	685	[b] 36.69	737	[b] 39.47	632	[c] 33.31
February	608	[b] 36.05	595	[b] 35.28	473	[c] 27.59
March	563	[b] 30.15	600	[b] 32.13	464	[c] 24.45
April	530	[b] 29.32	555	[b] 30.27	416	[c] 22.65
May	526	[b] 28.16	600	[b] 32.13	462	[c] 24.35
June	593	[b] 32.81	693	[b] 36.72	402	[c] 21.89
July	747	[b] 40.00	1,451	[b] 77.72	.....	.....
August	841	[b] 45.03	1,182	[b] 63.31	.....	.....
September	1,013	[b] 56.06	835	[b] 46.22	.....	.....
October	850	[b] 45.51	684	[b] 36.64	.....	.....
November	944	[b] 52.24	653	[b] 36.14	.....	.....
December	841	[b] 45.03	597	[b] 31.98	.....	.....

[a] Death rate computed on population of 244,732 (health department's census).
[b] Death rate computed on population of 249,941 (official census, 1903.)
[c] Death rate computed on population of 223,542 (health census of 1907).

Mortality compared with same period of previous years.

	First quarter.		Second quarter.		Third quarter.		Fourth quarter.	
	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.	Number of deaths.	Annual death rate per 1,000.
1901	2,327	42.93	2,410	43.97	2,077	47.49	2,561	46.22
1902	2,236	41.25	4,433	80.89	5,067	91.46	2,715	29.00
1903	1,652	30.48	1,911	34.87	2,710	48.91	3,085	55.68
1904	2,256	41.16	2,314	42.22	2,962	53.46	2,769	49.98
1905	1,856	34.24	1,649	30.09	2,601	46.94	2,635	47.56
1906	1,932	35.64	1,848	33.72	3,468	62.59	1,934	34.90
1907	1,569	28.48	1,280	22.98	.....	.....	.....	.....

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A VIEW OF THE SITE OF DAM OF THE NEW WATER SYSTEM LOOKING WEST THROUGH THE GORGE.

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ANOTHER VIEW OF THE SITE OF DAM OF THE NEW WATER SYSTEM LOOKING WEST THROUGH THE GORGE.

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LAYING PIPE FOR THE NEW WATER SYSTEM.

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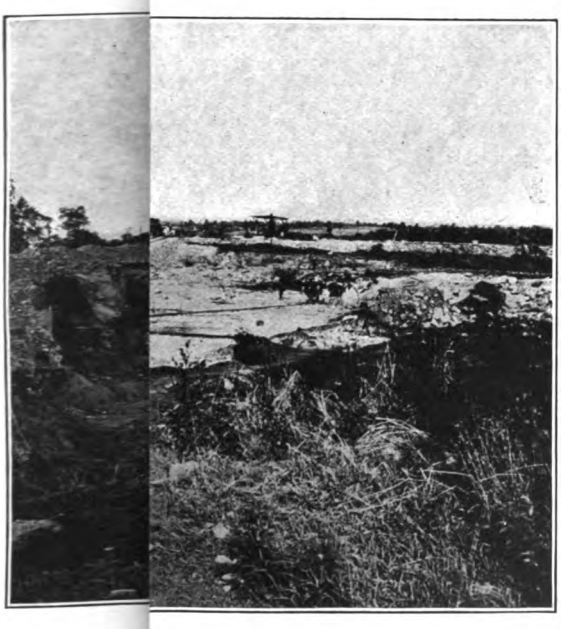

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A VIEW OF THE NEW RESERVOIR OF THE WATER SYSTEM UNDER CONSTRUCTION.

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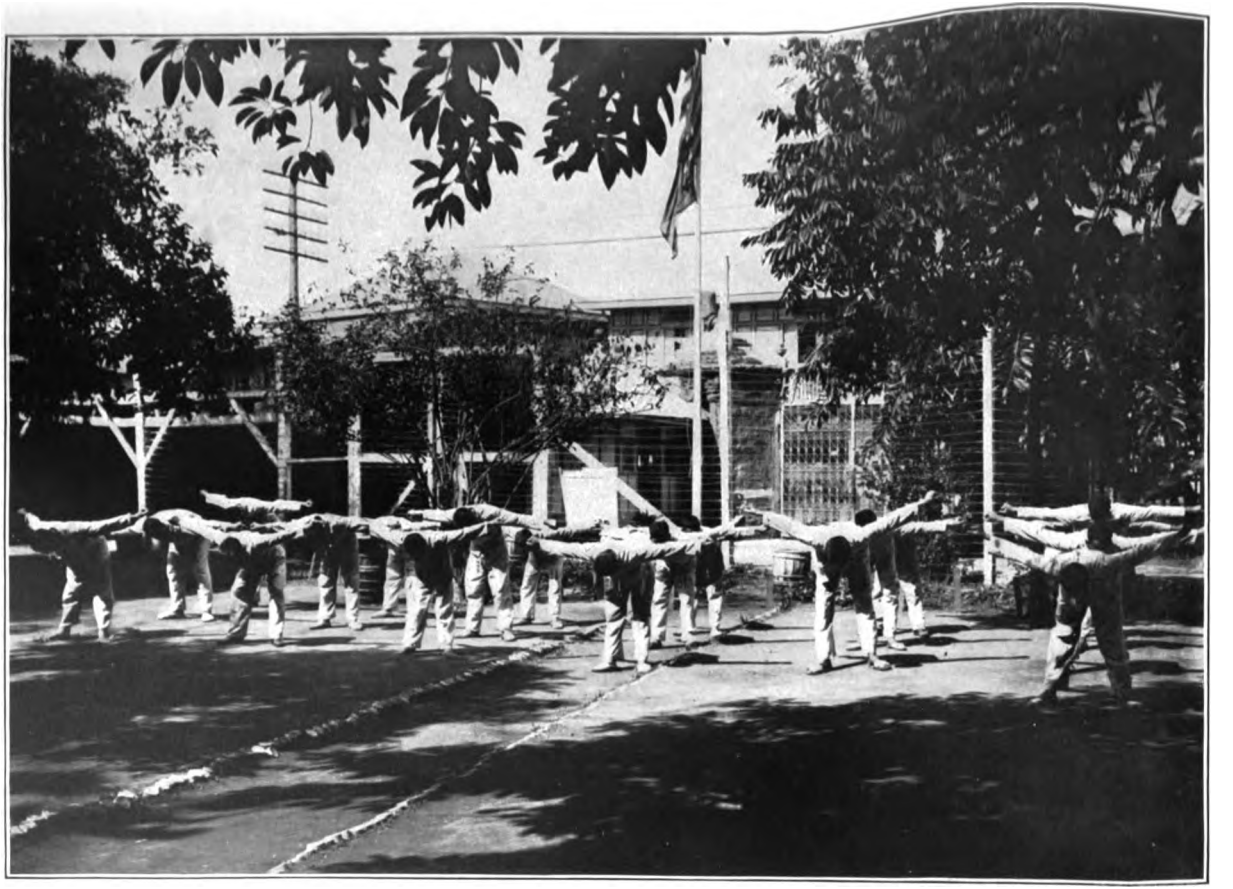

TUBERCULAR PATIENTS IN HOSPITAL "B," BUREAU OF PRISONS, TAKING EXERCISE.

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NATIVE PEDDLERS OF SORBETE AND DULCES.

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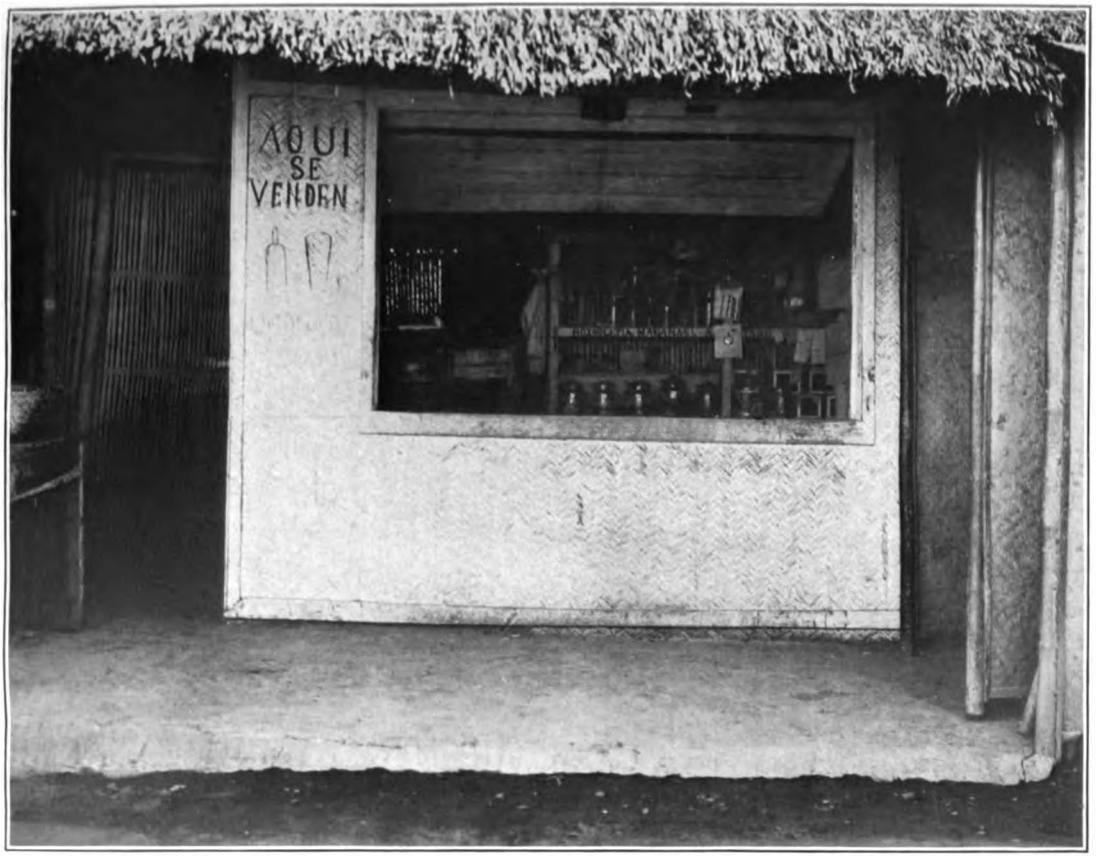

A TIENDA AFTER REPAIRS WERE COMPLETED.

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TIENDA BEFORE SANITARY REPAIRS.

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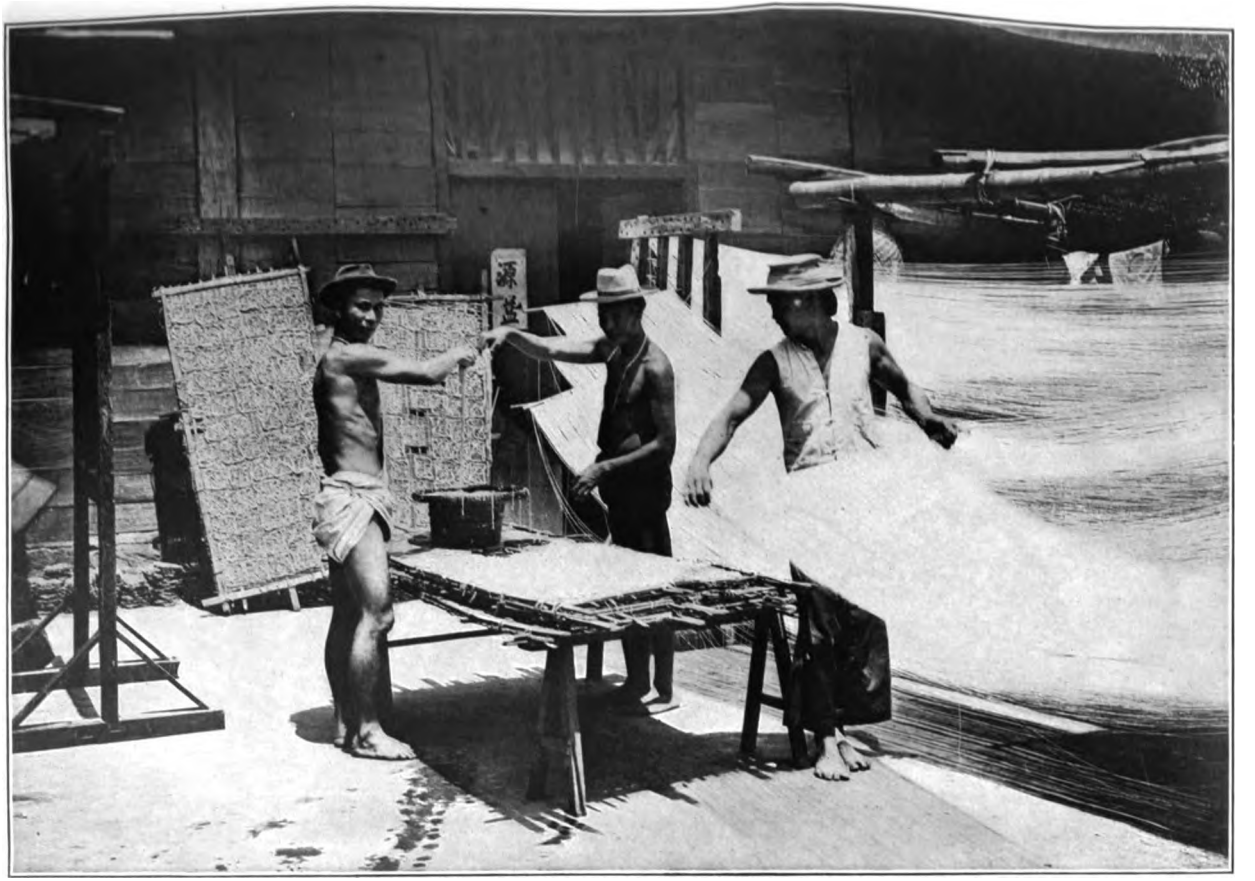

MAKING MISUA AND MIQUI (NATIVE FOODS).

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MILK VENDORS, OLD STYLE.

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MILK VENDOR, NEW STYLE.

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MILK STERILIZING DEPOT CONDUCTED BY THE "GOTA DE LECHE" SOCIETY.

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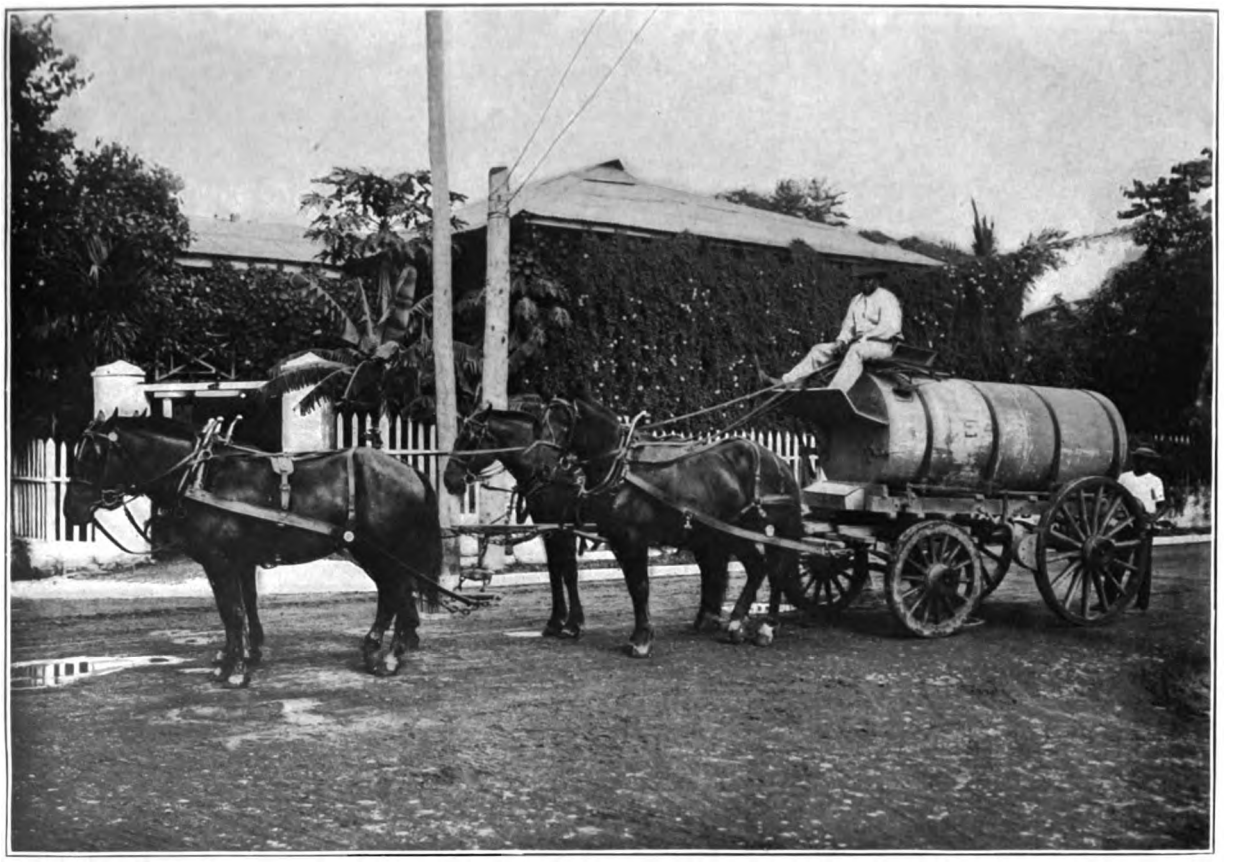

MILITARY WATER WAGON DELIVERING DISTILLED WATER.

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DISTILLED WATER WAGON, BUREAU OF SUPPLY, DIVISION OF COLD STORAGE.

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GOVERNMENT COLD-STORAGE ICE WAGON.

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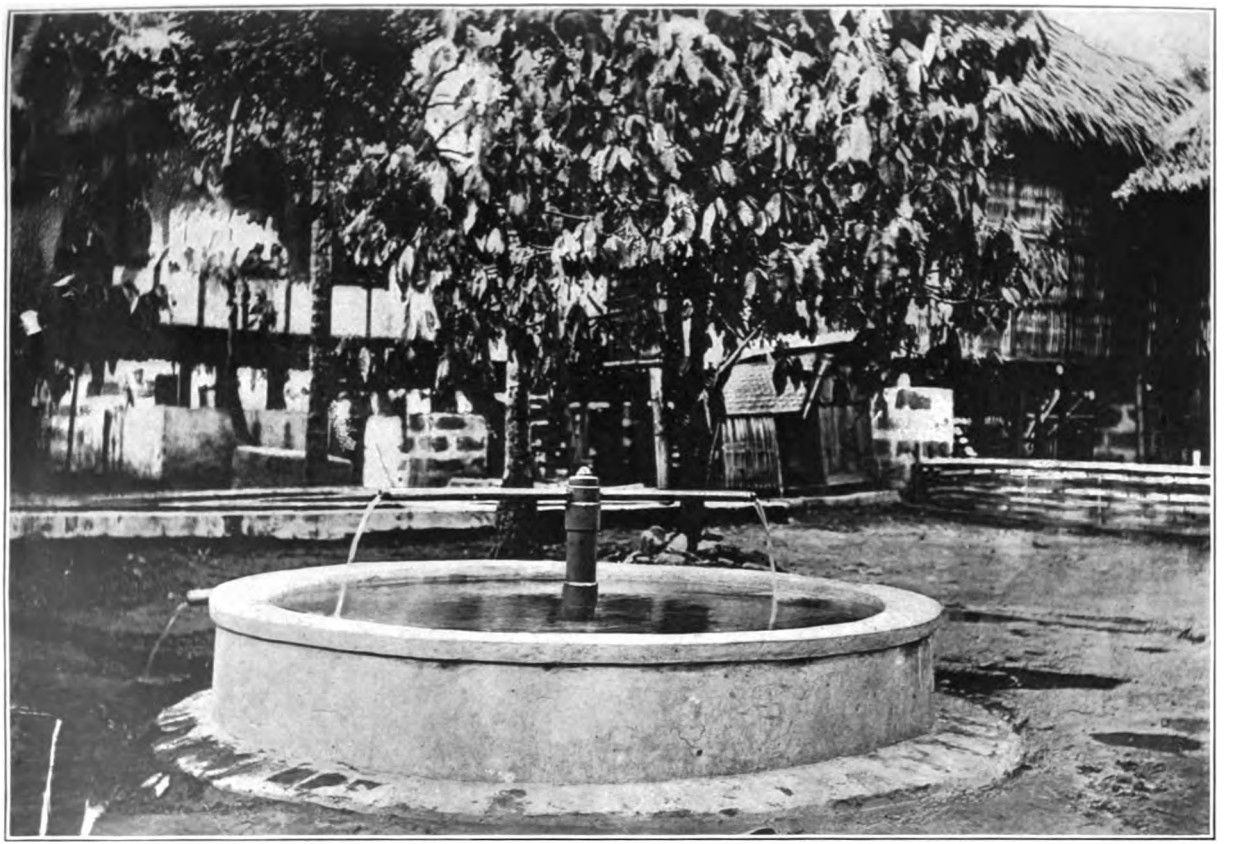

PRIVATE ARTESIAN WELL, BACOLOR, PAMPANGA PROVINCE.

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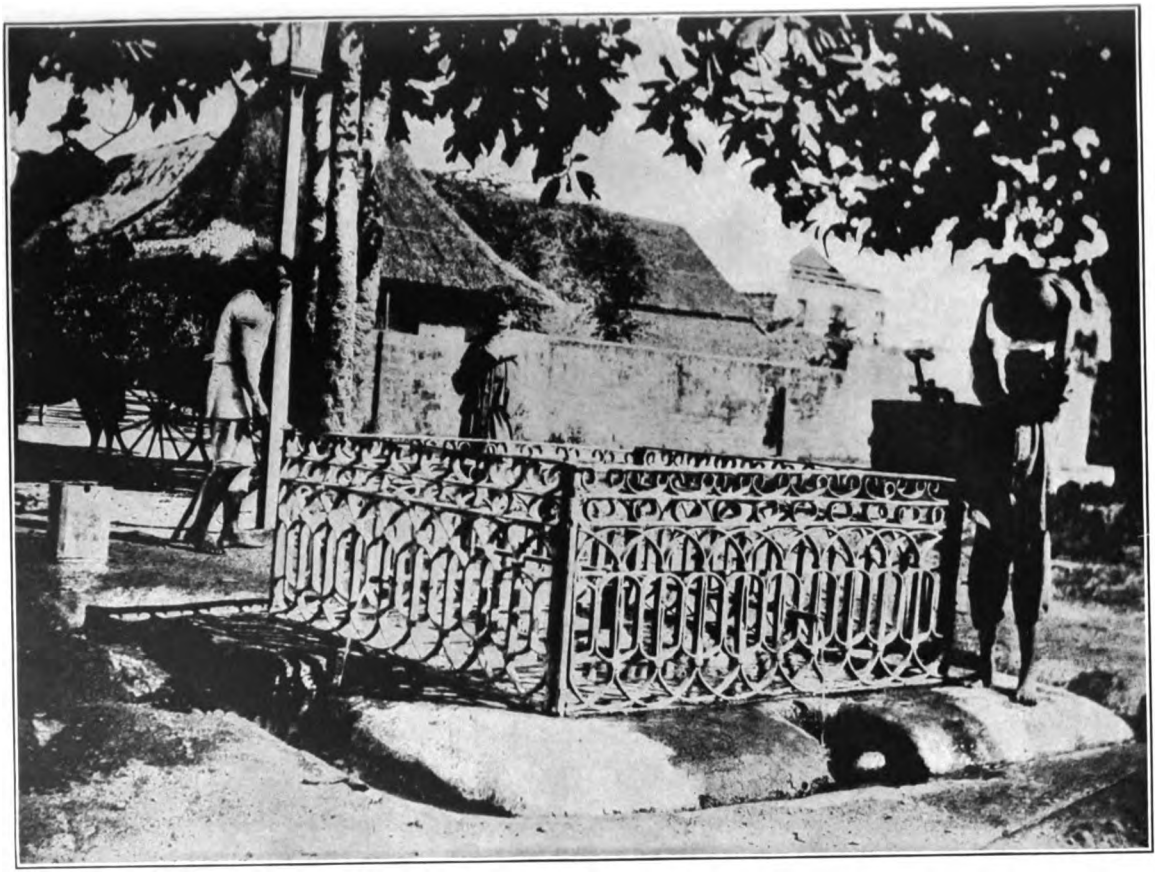

MUNICIPAL ARTESIAN WELL, BACOLOR, PAMPANGA PROVINCE.

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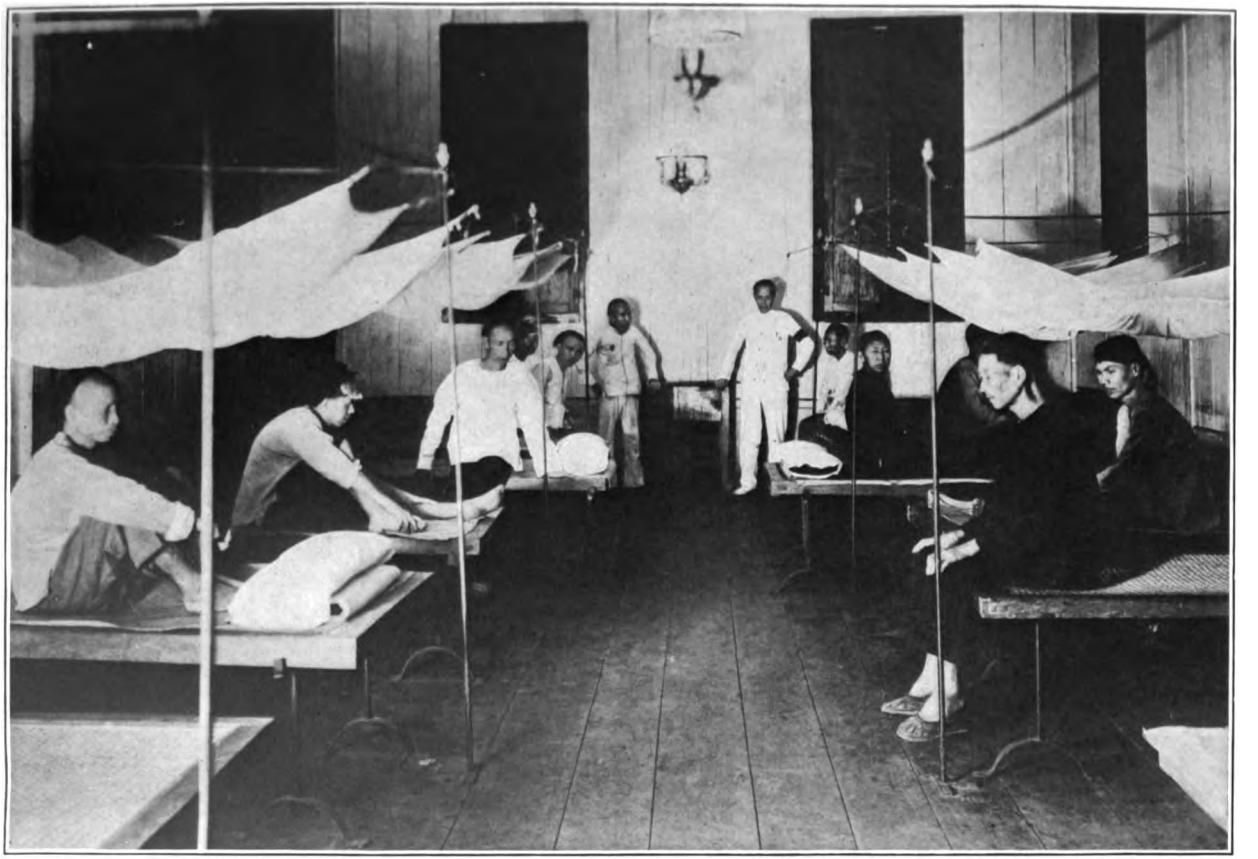

WARD SCENE, CHINESE HOSPITAL.

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Reports received of lepers living in the various provinces.[a]

Provinces.	Race.	Males.	Females.	Children.		Single.		Married.		Widowers.	Widows	Total.
				Males.	Females.	Males.	Females.	Males.	Females.			
Abra	Filipino.	6	5	1	.....	4	3	1	2	.....	.....	11
Albay	do	41	16	3	3	27	9	8	3	3	1	57
Amboe Camarines	do	20	13	.....	.....	5	7	10	6	5	.....	33
Antique	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Bataan	do	5	3	.....	.....	3	.....	2	1	.....	2	8
Batangas	do	18	13	1	.....	14	6	2	3	1	4	31
Benguet[b]	do	32	11	1	1	1	.....	21	10	9	.....	43
Bulacan	do	27	15	.....	1	11	9	13	3	3	2	42
Cagayan	do	42	41	1	.....	13	15	23	13	5	13	83
Cavite	do	50	25	2	2	29	18	16	4	3	1	75
Cebu	do	195	81	24	8	102	40	63	17	6	16	276
Culion[c]	do	491	248	96	46	218	110	154	69	23	23	739
Ilocos Norte	do	78	40	2	1	22	18	51	17	3	4	118
Ilocos Sur	do	149	86	11	2	74	46	47	26	17	12	235
Isabela	do	8	2	.....	.....	2	.....	6	2	.....	.....	10
La Laguna	do	15	10	.....	4	9	3	5	1	1	2	25
Lepanto-Bontoc[b]	do	15	4	1	.....	5	1	8	.....	1	3	19
Misamis	do	54	22	4	.....	28	14	20	6	2	2	76
Moro[b]	Moro	143	77	3	3	86	44	45	18	9	12	220
Negros Occidental	Filipino.	2	.....	.....	.....	1	.....	1	.....	.....	.....	2
Nueva Ecija	do	29	15	1	.....	11	5	14	6	3	4	44
Nueva Vizcaya[b]	do	2	4	.....	.....	1	.....	1	2	.....	2	6
Pampanga	do	13	3	1	.....	5	2	4	1	3	.....	16
Pangasinan	do	49	32	.....	1	18	9	24	14	7	8	81
Rizal	do	51	26	6	4	20	8	24	13	1	1	77
Romblon	do	2	.....	.....	.....	.....	.....	1	.....	1	.....	2
Samar	do	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30
Sorsogon	do	59	28	1	2	24	18	27	4	7	4	87
Surigao[b]	do	2	1	.....	.....	.....	.....	.....	.....	2	1	3
Tarlac	do	25	15	.....	1	5	6	18	8	2	.....	40
Tayabas	do	16	4	1	.....	9	2	4	2	2	.....	20
Union	do	30	17	.....	.....	11	8	18	4	1	5	47
Zambales	do	23	27	.....	.....	12	14	11	9	.....	4	50
San Lazaro Hospital	(d)	128	88	21	13	62	37	35	22	10	16	216
Total		1,820	972	181	92	832	452	677	286	130	142	2,826

[a] This is a complete report of all lepers known to exist in the Philippine Islands.
[b] Revised reports not received.
[c] European, 1; Filipinos, 737; Chinese, 1.
[d] Filipinos, 214; Chinese, 2.

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Reports received of insane persons living in the various provinces.

Provinces.	Race.	Males.	Females.	Children.		Single.		Married.		Widowers.	Widows.	Total.
				Males.	Females.	Males.	Females.	Males.	Females.			
Abra	Filipino.	34	9	3	4	25	1	6	1	.....	3	43
Albay	....do...	23	20	11	6	8	6	4	5	.....	3	43
Ambos Camarines	....do...	35	24	1	1	22	19	11	3	1	1	59
Antique	....do...	32	38	.....	.....	23	19	7	13	2	6	70
Bataan	....do...	9	2	.....	.....	5	.....	3	.....	1	2	11
Batangas	....do...	43	36	.....	.....	37	25	4	5	2	6	79
Bohol	....do...	279	280	11	7	209	212	50	45	9	16	559
Bulacan	....do...	29	23	.....	.....	22	13	4	7	3	3	52
Cagayan	....do...	17	15	.....	.....	12	8	3	4	2	3	32
Capiz	....do...	67	60	.....	1	45	27	16	18	6	14	127
Cavite	....do...	29	27	.....	.....	16	13	10	10	3	4	56
Cebu	....do...	203	124	14	9	162	95	25	13	2	7	327
Ilocos Norte	....do...	73	30	.....	.....	58	17	11	6	4	7	103
Ilocos Sur	....do...	109	55	2	1	75	34	25	10	7	10	164
Iloilo	....do...	90	90	1	.....	72	49	14	19	3	22	180
Isabela	....do...	9	6	.....	.....	4	1	5	5	.....	.....	15
La Laguna	....do...	19	16	.....	.....	15	7	3	5	1	4	35
Lepanto-Bontoc	....do...	10	7	.....	.....	6	5	3	.....	1	2	17
Leyte	....do...	34	17	3	.....	27	13	3	4	1	.....	51
Masbate	....do...	15	21	1	1	9	14	4	5	1	1	36
Mindoro	....do...	9	7	.....	.....	8	4	1	2	.....	1	16
Misamis	....do...	69	64	4	.....	46	35	14	17	5	12	133
Negros Occidental	....do...	58	38	.....	.....	40	20	12	9	6	9	96
Negros Oriental	....do...	99	78	.....	.....	80	62	15	8	4	8	177
Nueva Ecija	....do...	19	19	.....	1	17	12	1	5	1	1	38
Nueva Vizcaya	....do...	4	5	.....	.....	4	1	.....	3	.....	1	9
Pampanga	....do...	35	25	.....	.....	26	13	9	6	.....	6	60
Pangasinan	....do...	86	67	2	.....	49	28	24	25	11	14	153
Rizal	....do...	41	16	.....	.....	32	11	5	2	4	3	57
Romblon	....do...	5	.....	.....	.....	3	.....	2	.....	.....	.....	5
Samar	....do...	32	28	.....	.....	24	19	4	4	4	5	60
Sorsogon	....do...	88	63	.....	.....	65	36	19	21	4	6	151
Surigao	....do...	9	10	.....	.....	5	6	2	2	2	2	19
Tarlac	....do...	10	10	.....	.....	5	6	5	3	.....	1	20
Tayabas	....do...	128	103	8	1	95	75	21	15	4	12	231
Union	....do...	38	25	.....	.....	18	17	15	6	5	2	63
Zambales	....do...	4	6	.....	.....	3	3	1	1	.....	2	10
San Lazaro Hospital	(a)	76	16	3	.....	50	7	18	6	5	3	92
Total	.....	1,969	1,480	64	32	1,422	933	379	313	104	202	3,449

a Americans, 5; Europeans, 2; Filipinos, 81; Chinese, 2; others, 2.

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Reports received of blind persons living in the various provinces.

Provinces.	Race.	Males.	Females.	Children.		Single.		Married.		Widowers.	Widows.	Total.
				Males.	Females.	Males.	Females.	Males.	Females.			
Abra	Filipino.	44	55	2	.....	10	15	18	22	14	18	99
Albay	....do...	365	301	73	67	177	150	84	47	31	37	666
Ambos Camarines	....do...	136	116	8	16	64	46	42	19	22	35	252
Antique	....do...	72	59	9	4	28	23	20	10	15	22	131
Bataan	....do...	22	21	7	5	8	8	4	1	3	7	43
Batangas	....do...	92	88	15	7	32	38	32	10	13	33	180
Bohol	....do...	198	150	46	25	91	69	46	25	15	31	348
Bulacan	....do...	122	82	14	6	44	35	37	17	27	24	204
Cagayan	....do...	51	64	3	4	15	14	18	13	15	33	115
Capiz	....do...	148	148	12	9	54	49	46	27	36	63	296
Cavite	....do...	52	44	5	4	22	20	15	6	10	14	96
Cebu	....do...	344	295	40	22	152	133	106	59	46	81	639
Ilocos Norte	....do...	90	107	5	1	21	36	37	18	27	52	197
Ilocos Sur	....do...	114	132	13	15	38	37	40	29	23	51	246
Iloilo	....do...	229	235	28	14	92	89	69	31	40	101	464
La Laguna	....do...	127	107	17	9	40	39	50	23	20	36	234
Leyte	....do...	326	195	64	22	168	95	57	29	37	49	521
Masbate	....do...	32	35	2	2	14	13	12	7	4	13	67
Misamis	....do...	71	48	6	4	43	21	14	12	8	11	119
Negros Occidental	....do...	59	40	.....	2	31	16	21	5	7	17	99
Negros Oriental	....do...	142	103	14	15	57	34	36	15	35	39	245
Nueva Ecija	....do...	43	42	3	3	16	13	12	9	12	17	85
Pangasinan	....do...	166	183	12	15	63	47	64	43	27	78	249
Rizal	....do...	115	86	30	9	30	26	34	11	21	40	201
Romblon	....do...	36	29	5	6	17	17	10	4	4	2	65
Samar	....do...	133	69	.....	.....	67	29	32	20	34	20	202
Sorsogon	....do...	225	140	25	16	139	94	45	17	16	13	365
Surigao	....do...	37	26	6	2	14	6	12	12	5	6	63
Tarlac	....do...	47	36	1	1	17	10	22	8	7	17	83
Tayabas	....do...	101	84	.....	.....	.....	.....	.....	.....	.....	.....	185
Union	....do...	59	46	3	2	19	9	21	14	16	21	105
Total	.....	3,798	3,166	468	307	1,583	1,231	1,056	563	590	981	6,964

Smallpox and plague reports for Manila.

Nationality.	Smallpox.				Plague.			
	Cases.		Deaths.		Cases.		Deaths.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Americans	.....	1	.....	.....	.....	.....	.....	.....
Filipinos	49	24	1	.....	.....	.....	.....	.....
Foreigners	.....	.....	.....	.....	.....	.....	.....	.....
Chinese	1	.....	.....	.....	.....	.....	.....	.....
Total	50	25	1	.....	.....	.....	.....	.....

Health district and age.	Smallpox.		Plague.	
	Cases.	Deaths.	Cases.	Deaths.
Health districts:				
No. 1, Intramuros	7	.....	.....	.....
No. 2, Meisic	40	1	.....	.....
No. 4, Sampaloc	8	.....	.....	.....
No. 5, Tondo	19	.....	.....	.....
No. 6, Paco	1	.....	.....	.....
Total	75	1	.....	.....
Ages:				
Under 1 year	5	1	.....	.....
1 year to 10 years	21	.....	.....	.....
10 years to 20 years	23	.....	.....	.....
20 years to 30 years	20	.....	.....	.....
30 years to 40 years	5	.....	.....	.....
40 years to 50 years	1	.....	.....	.....
Over 50 years	.....	.....	.....	.....
Total	75	1	.....	.....

Number of cases found alive, smallpox, 75; plague, 0.
Number of cases found dead, smallpox, 1; plague, 0.

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Cholera report, city of Manila.

Nationality.	Cases.		Deaths.	
	Male.	Female.	Male.	Female.
Americans	12	.....	9	.....
Filipinos	371	291	318	270
Foreigners	17	5	6	2
Chinese	22	.....	20	.....
Total	422	296	353	272

District and age.	Cases.	Deaths.
Health districts:		
No. 1, Intramuros	87	69
No. 2, Meisic	241	208
No. 4, Sampaloc	102	89
No. 5, Tondo	220	196
No. 6, Paco	68	63
Total	718	625
Ages:		
Under 1 year	9	9
1 year to 10 years	178	168
10 years to 20 years	123	93
20 years to 30 years	193	165
30 years to 40 years	112	91
40 years to 50 years	52	51
Over 50 years	51	48
Total	718	625

Number of cases found alive	282
Number of cases found dead	436
Total	718

Cases and death registered from cholera in the Philippine Islands (city of Manila excepted).

Province.	Cases.	Deaths.	Mortality.
			Per cent.
Bataan	1	0	0.00
Batangas	2	1	50.00
Benguet	1	1	100.00
Bulacan	1,290	925	71.70
Capiz	260	156	60.00
Cavite	214	165	77.10
Iloilo	1,798	1,319	73.45
Laguna	447	344	76.95
Moro	9	7	77.77
Nueva Ecija	765	546	71.37
Occidental Negros	92	64	69.56
Pampanga	1,038	764	73.60
Pangasinan	85	65	76.44
Rizal	780	627	80.38
Samar	80	69	86.25
Tarlac	91	78	85.71
Tayabas	132	112	84.84
Grand total and general average	7,085	5,243	74.00

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Epidemic of cholera in the city of Manila and provinces from August 23, 1905, to June 30, 1907.

Period.	Manila.			Provinces.		
	Cases.	Deaths.	Mortality.	Cases.	Deaths.	Mortality.
			Per cent.			*Per cent.*
August, 1905	51	46	90.19	81	65	80.24
September, 1905	147	126	85.71	334	252	75.44
October, 1905	31	29	93.54	358	249	69.55
November, 1905	18	17	94.44	480	335	69.79
December, 1905	8	8	100.00	387	290	75.06
First quarter, 1906	28	27	96.42	2,138	1,644	76.89
Second quarter, 1906	102	92	90.19	365	236	64.65
Third quarter, 1906	684	595	86.98	4,893	3,703	75.67
Fourth quarter, 1906	34	30	88.20	1,942	1,379	71.00
First quarter, 1907				235	148	62.97
Second quarter, 1907						
Total	1,103	970	87.94	11,213	8,301	74.03

Culion leper colony division.

Status.	Europeans.		Filipinos.		Chinese.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	
Remaining, September 30, 1906	1		199	137	1		338
Admitted			434	181			615
Born			2	3			5
Discharged			4	1			5
Transferred							
Escaped			7	2			9
Died			135	70			205
Remaining, June 30, 1907	1		489	248	1		739

FINANCIAL STATEMENT.

The following statement shows the expenditures made during the fiscal year 1907 chargeable against the appropriation made by act No. 1527 for the bureau of health during that period:

Amount appropriated		₱1,038,000.00
Expenditures chargeable as follows:		
Salaries and wages—		
General	₱133,438.26	
Examining boards	1,125.88	
Emergency funds, general	1,843.75	
District health officers, at large	37,015.62	
District health officers, special districts	76,299.10	
Culion leper colony division	16,680.88	
Emergency fund, Culion	340.35	
Vaccinating division	54,275.50	
San Lazaro Hospitals division	37,007.50	
Emergency fund, San Lazaro	17,245.55	
Civil Hospital division	65,167.87	
Emergency fund, Civil Hospital division	176.00	
Benguet Sanitarium division	7,741.17	
Prison Sanitation division	6,943.33	
		455,300.76
Contingent expenses:		
General—		
Medicines for indigent natives	5,794.60	
Disinfecting apparatus and disinfectants	4,953.85	
Stationery and office supplies	2,520.16	
Miscellaneous supplies	509.41	
Rent, post-office box	32.00	
Transportation of freight	1,494.97	

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Contingent expenses—Continued.		
General—Continued.		
Telephone, general	₱700.73	
Purchase of office furniture	1,909.66	
Cablegrams	66.00	
Periodicals	54.60	
Repairs to office furniture	182.25	
Surgical instruments	18.00	
Printing	15,181.39	
Transportation, city of Manila	20,133.89	
Traveling expenses, regular employees	10,745.25	
Incidentals	190.40	
Postage and telegrams	1,450.88	
Hospicio de San José	46,785.30	
Hospital de Santiago	960.00	
Colegio de Santa Isabel	4,848.56	
San Vicente de Paul Orphan Asylum	1,448.90	
Traveling expenses, district health officers, special districts	9,137.45	
Sanitary stations, rent	320.00	
Incidentals, sanitary station	131.65	
		₱129,569.90
Vaccinating division:		
Ice for preserving virus	442.95	
Purchase of vaccine	30,236.75	
Antiseptic supplies and dressings for vaccinators	2,710.12	
Traveling expenses of vaccinators	9,319.69	
		42,709.51
San Lazaro hospitals division:		
Subsistence	48,884.57	
Leper gratuity	2,316.43	
Medicines	1,886.41	
Fuel	1,769.93	
Lights	3,002.20	
Soap	673.51	
Forage and horseshoeing	705.49	
Clothing, insane	619.80	
Tobacco and cigarettes	124.61	
Clothing lepers	1,715.12	
Bedding	195.80	
Incidentals	1,890.42	
Telephone	176.05	
		63,961.34
Civil hospital division:		
Subsistence	61,963.54	
Medicines	8,850.83	
Miscellaneous and general supplies	5,528.71	
Post-office box rent	24.00	
Transportation in Manila	3.00	
Repairs and purchase of equipment	1,019.02	
Rent of buildings	12,000.00	
Lights	4,187.63	
Telephone	281.00	
Coal and oil	1,284.88	
Laundry	7,367.23	
Forage	390.53	
Horseshoeing	38.64	
Traveling expenses, employees	920.00	
Incidentals	286.55	
		104,145.06
Culion leper colony division:		
Subsistence, employees	2,959.40	
Subsistence, lepers	27,835.56	
Hospital equipment	337.20	
Leper gratuity	4,734.26	
Clothing	3,189.40	
Bedding	200.00	
Stationery and printing supplies	18.20	

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Culion leper colony division—Continued.		
Fuel, light, oil, etc	₱1,067.53	
Medicines and medical supplies	206.05	
Incidentals	2,153.10	
Transportation of lepers	780.90	
		₱43,481.60
Prison sanitation division:		
Medicines	9,135.73	
Disinfectants	1,924.06	
		11,059.79
Benguet Sanitarium division:		
Subsistence	2,914.51	
Hospital furnishings	894.66	
Medicines and surgical supplies	267.04	
Fuel	348.20	
Maintenance of transportation	44.45	
Laundry	450.00	
Repairs	3.00	
Incidentals	262.95	
		5,184.81
Grand total		855,412.77

In addition to the foregoing statement of actual expenditures made from funds appropriated in act No. 1527, there are the following outstanding obligations chargeable to the appropriation of the bureau and funds appropriated for same during the fiscal year 1907:

Stationery and office supplies	₱188.66
Incidentals, sanitary stations	19.80
Medicines and supplies, Central Dispensary	493.78
Dressings, supplies, vaccinating division	663.50
Disinfectants, Manila	274.32
Medicines and disinfectants, prison sanitation division	277.54
Medicines and supplies, indigent persons	308.40
Incidentals, San Lazaro Hospital	108.93
Medicines and supplies, San Lazaro Hospital	930.39
Soap, San Lazaro Hospital	480.70
Miscellaneous supplies, civil hospital	577.15
Medicines and supplies, civil hospital	1,587.10
Coal and oil, civil hospital	202.81
Medicines and supplies, Culion leper colony	620.89
Bedding, Culion leper colony	174.66
Freight and postage, Culion	100.41
Clothing, Culion leper colony	3,172.43
Incidentals, Culion leper colony	50.96
Kitchen equipment, Culion leper colony	28.50
Medical and surgical supplies, Benguet Sanitarium	35.02
Freight, Benguet	8.63
Balance freight, Benguet	1.89
	10,306.47

In addition to these appropriations there was appropriated by resolution of the Commission, subsequently confirmed by act No. 1660, ₱10,000 for the collection of lepers, the whole of which has been expended as follows:

Collection and maintenance of lepers	₱8,070.53
Traveling expenses of officers and employees in connection with the collection of lepers	420.70
	8,491.23
Outstanding obligations	1,508.77
	10,000.00

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The Commission also appropriated ₱55,000 for the construction of an annex for 250 additional insane at San Lazaro, the construction of which was undertaken by the bureau of public works. From this sum ₱10,000 was allotted for the furnishing and equipment of the annex, which was expended as follows:

Phonograph and records	₱125.00
Sundries	4,770.38
Outstanding obligations:	
Miscellaneous sup., bureau of science—	
Coal, blankets, etc	1,031.90
Others not specified	2,072.72
Returned to bureau of public works	2,000.00
	10,000.00

The following amounts as credits to this appropriation were collected during the year:

Refund by provinces of salaries of district health officers	₱66.363.02
Refund by bureau of education of one-hâlf salary of Dr. Anna Dixon Peck, supervising nurse	472.21
Sale of medicines	730.86
Sale of supplies, ambulances, bull carts, sanitary pails, demijohns, etc.	4,712.68
Miscellaenous collections, San Lazaro Hospital	308.20
Miscellaneous collections, civil hospital	26,176.12
Miscellaneous collections, Benguet sanitarium	10,173.13
Subsistence Culion leper colony	154.64
	109,087.68

NOTE.—Detailed statistical data on the following subjects has been omitted from this appendix and are on file in the Bureau of Insular Affairs, War Department:

Births and deaths.
Diseases causing death.
Deaths by occupations.
Number attended by municipal physicians.
Report of crematories.
Sanitary inspection and disinfection.
Action taken on application for licenses.
Vaccinations.
Sera.
Cholera.
San Lazaro Hospital.
Leprosy, cholera, plague, and smallpox statistics.
Morgue and crematory.
Bilibid vital statistics.
Civil hospital.
Chinese hospital.
Benguet sanitarium.
Iwahig penal colony.
Sanitary engineering data.

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APPENDIX B.

REPORT OF THE CHIEF QUARANTINE OFFICER.

UNITED STATES TREASURY DEPARTMENT,
PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE,
OFFICE OF THE CHIEF QUARANTINE OFFICER FOR THE PHILIPPINE ISLANDS,
Manila, P. I., August 1, 1907.

SIR: I have the honor to submit the following report of the transactions of the bureau of quarantine service for the Philippine Islands for the fiscal year ended June 30, 1907:

The close of this period finds the health situation in the Philippines more satisfactory than at any time since American occupation of these islands in 1898, and from a study of the history previous to that date it is probably safe to infer that sanitary conditions are better than for many years prior to 1898.

Cholera is not known to be present anywhere in the islands. There has been no case of plague since April, 1906. There is less smallpox than for any period during the past 50 years. In provinces in which there have been 6,000 deaths annually heretofore from this cause not one person has died, nor has there been one death form this disease in the city of Manila. Owing to the thorough and persistent vaccination of the crews of vessels only one case of varioloid occurred among them, instead of a great number as heretofore.

While the major part of the improvement which has been brought about is due to the efforts of the insular health authorities, yet great assistance to this end was rendered by the quarantine service in the Philippines, and by the Public Health and Marine-Hospital Service officers who are stationed at the principal China and Japan ports. Not only was not a single case of quarantinable disease permitted to enter the Philippine Islands from foreign countries, but also the efforts of this bureau in preventing the spread by sea of cholera, which prevailed extensively in Manila at the beginning of the fiscal year, were entirely successful.

It is satisfactory to report that the work of the Public Health and Marine-Hospital Service continues to meet with encouragement at the ports of entry of the Philippine Islands, and the most cordial relations exist between the Service and the army, navy, customs, and insular officials. The uniform effectiveness of the measures instituted for the protection of the islands has gained for the Service the confidence of the public, and even the inconvenience of 14 months of outgoing quarantine during a period of great business depression was borne with admirable patience.

PERSONNEL.

Passed Asst. Surg. Victor G. Heiser, chief quarantine officer for the Philippine Islands.

Manila.—Passed Asst. Surg. Victor G. Heiser, in command; Passed Asst. Surg. T. B. McClintic; Asst. Surg. F. H. McKeon; pharmacist and disbursing officer, N. C. Comfort.

Mariveles.—Asst. Surg. R. E. Ebersole.

Iloilo.—Asst. Surg. Joseph Pettyjohn.

Cebu.—Asst. Surg. Herbert M. Manning; Pharmacist Charles R. McBride.

Zamboanga.—Acting Asst. Surg. J. F. Siler.

Jolo.—Acting Asst. Surg. Charles B. Ewing.

Cavite.—Acting Asst. Surg. D. N. Carpenter.

Olongapo.—Acting Asst. Surg. C. P. Kindleberger.

In addition to the officers 71 employees are now engaged in assisting to conduct the service operations. They perform the duties of clerks, disinfectors, vaccinators, crews of vessels, quarantine attendants, etc. Total personnel, 83.

The present chief quarantine officer also occupied the position of director of health for the Philippine Islands during the year. The arduous labors of both positions, the responsibility, and the control of an appropriation of over a million has taxed his physical powers almost to the utmost.

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MANILA OFFICE.

The offices occupied by the bureau are located in the custom-house and are very convenient to the shipping public.

The office work has been conducted by the chief clerk, one American clerk, two Filipinos who act as clerks and disinfectors, and a janitor-messenger. The clerical work has been kept practically up to date. The card indexing of all the incoming and outgoing correspondence from 1900 to date has been completed. The office hours have been from 7.30 a. m. to 6 p. m. every day, and it has been due to the long hours of constant application that the vast amount of work has been accomplished. The office force not only handles the correspondence, reports, and records for both the Federal and insular governments, but also secures and forwards the supplies to the stations in the islands, vaccinates members of crews who apply at the office, inspects cargo and effects for shipment to the United States, issues bills of health, certifies all shipments on United States bills of lading, prepares the estimate, and disburses the quarantine service appropriation.

CHOLERA.

At the beginning of the year the service was confronted with the problem of preventing the spread of cholera by sea from Manila and near-by provinces to other islands in the Philippines. Cholera had commenced to spread slowly by land—both north and south of Manila. Toward the south it traveled overland and soon reached the ports of Lucena, Pagbilao, Pitogo, and Catanauan, situated on the China Sea, and upon the western shore of the province of Tayabas, but, fortunately, by the thorough cooperation of the municipal officials and of the insular bureau of health with this service, no spread by sea took place. In September the disease suddenly appeared in epidemic form in Dumangas, which is a port on the east coast of the island of Panay, in the province of Iloilo, and about 20 miles above the port of Iloilo. All of its communication with the island of Luzon, which was the only one which was infected at the time, was done through the port of Iloilo. The first cases occurred among the very poorest and most poverty-stricken members of the community, and all were persons who had not been away from Dumangas for several weeks previous and persons who were not likely to partake of any imported food which would be likely to convey cholera. It was at first thought that possibly a person in the incubation period of the disease had come from Manila and entered the port of Iloilo, and then proceeded to Dumangas, and in that way carried the disease to that place. A thorough investigation of this matter was made, and it can be said almost with certainty that this did not take place. The disease soon spread south, and in a short while made its appearance in the suburbs of Iloilo, where it was definitely recognized as cholera. Energetic measures were at once taken to prevent the spread of the disease from the province of Iloilo to Negros and other islands, and these efforts were entirely successful, but later they were defeated, because the quarantine restrictions were withdrawn by the insular authorities, owing to the persistent clamor which was made against outgoing quarantine detention, and as a result the disease made its appearance shortly afterwards in a number of places on the island of Negros.

In order to prevent the spread of the disease to the island of Cebu a quarantine was imposed against Negros and Iloilo, and apparently with entire success, since no cases of the disease made their appearance on that island.

There occurred in all on the island of Panay, which includes the province of Iloilo, 2,058 cases, with 1,475 deaths, and 92 cases, with 64 deaths, on the island of Negros. The entire number of cases in the Philippines was 7,933, with 5,987 deaths.

At the outgoing quarantine which was imposed upon vessels leaving the port of Manila 3 cases were detected. The measures prescribed by the regulations were promptly carried out and no further cases occurred.

The number of vessels on which cholera was found scarcely represents the good which was accomplished by the quarantine. Many persons who were in the incubation period of the disease and much cargo which was likely to convey cholera were not taken aboard by the shipping people because of the certainty of detection.

All vessels underwent their quarantine at Mariveles, at which place, with a minimum amount of guarding, the communication with other vessels and with the shore was most easily controlled. It is believed that much of the success

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which attended the quarantine was due to the fact that no attempt was made to quarantine vessels in Manilla, because the experience of 1902 showed that it was practically impossible to prevent communication with shore.

The experience of the service with cholera during the past year has still further demonstrated that its spread by sea can be successfully controlled; that the incubation period of the disease, after it has once established itself, is practically never beyond forty-eight hours, and that persons who ordinarily travel as first-class passengers practically never carry cholera. That the incubation period is rarely ever more than forty-eight hours seems to be so conclusively demonstrated that the outgoing quarantine detention instead of being made five days was reduced to two days, which was manifestly a most important factor in reducing the losses, delays, and annoyances incident to a quarantine, and at the same time the safety of the islands was not jeopardized.

PLAGUE.

Since the bureau of health has adopted the plan that plague may be eradicated by isolation of the sick and the destruction of plague-infected rats, complete success has been attained. There has been no case of plague in the Philippine Islands during the period covered by this report, except those which were accidentally caused by inoculations in Bilibid November 16, 1906, while prophylactic inoculations against cholera were being made by a member of the staff of the bureau of science, who used a culture which had been contaminated with plague organisms, under such circumstances as strongly to suggest criminal intent on the part of the unknown person who mixed a pure culture of cholera germs with an attenuated culture of plague bacilli. In all there were 24 cases due to this cause, 14 of which died, giving a mortality of 58 per cent. The bureau of health was entirely successful in preventing any spread from this source, although the cases occurred in a crowded penal institution, with a population of about 3,500 inmates. This again conclusively shows that modern sanitary science, when intelligently and promptly applied, may be depended upon to prevent the spread of this disease.

Manila, and, in fact, the entire Philippine Islands, present a plague record which stands in favorable contrast with that of the rest of the Orient. In India, 1 person out of every 300, or over 1,000,000 persons, are dying annually of plague. In Hongkong, Amoy, Singapore, Osaka, Yokohama, and other oriental cities having commercial intercourse with Manila, many cases are being constantly reported. The sanitary officials of many of these latter ports attribute their inability to stamp out the disease to the constant reinfection which takes place from neighboring countries, against which it has not been possible to enforce strict quarantine measures. The Philippines, in this respect, have been much more fortunate, but still they are also liable to constant reinfection on account of their geographical position and extensive and increasing commerce. Continued immunity from this disease can only be had by the greatest precautions being taken with vessels from infected ports and by placing ports of entry in such good sanitary condition that even should it be imported its eradication could easily be accomplished. This, so far as Manila is concerned at least, means that the insanitary areas must be improved and that insanitary structures must either be repaired or removed and constant vigilance exercised in order to ascertain whether the rats in the city are plague infected.

The usual quarantine of seven days was declared April 15, 1906, against vessels arriving from Amoy and other Chinese ports at which no service officers were stationed. The same was lifted October 8, 1906. Experience has shown that even though there are no cases officially reported in the Amoy district, yet the sanitary organization is so imperfect that many cases might be present without the fact being known by the officials. From reliable information received from private sources it is practically certain that plague has been present every year since 1900, so that the quarantine which has been imposed for the benefit of the Philippines was fully justified.

SMALLPOX AND VACCINATION.

Two vessels from foreign ports and three interisland vessels arrived at Philippine ports with smallpox on board. The cases were removed from the vessels and the usual vaccination, disinfection, and detention were ordered. No secondary cases occurred after the completion of the disinfection, except in the case of the passengers of the steamer *Ban Yek*, among whom two days after

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release and sixteen days after isolation and disinfection a suspicious eruption appeared. The cases all occurred among persons whose destination was a military post. The majority of the army surgeons who saw these eruptions diagnosed them as chicken pox, while others thought it was varioloid. All the cases were vaccinated with a potent lymph sixteen days or more previously.

On the United States cruiser *Chattanooga* several cases occurred before her arrival at quarantine. At Cebu, the British steamer *Mazagon* had one case of smallpox occur on board and was treated as outlined above.

The vaccination of the crews of vessels engaged in the interisland trade has been continued. At Manila there were 4,099 vaccinations, a decrease of 562 from the year previous. There were 506 vaccinations at Iloilo and 180 at Cebu—a total of 4,785 for the service in the Philippine Islands. The small number at Cebu and Iloilo is due to the fact that the islands in that vicinity have been completely vaccinated, and consequently there remain practically no more adults who require vaccination at this time.

Among the crews vaccinated at Manila there were 3,415 first, 727 second, and 150 third vaccinations, a total of 4,292, with 1,914 known "takes." The percentage of "takes," as in former years, was over 50 per cent, but the percentage is gradually decreasing, owing to the progress of the plan now being carried out by the bureau of health to vaccinate the entire population of the islands.

The practice of requiring crews to have service vaccination cards before they are employed on interisland vessels has been continued, and applicants for positions on vessels are vaccinated at all hours of the day at the offices of the service in the islands. To this practice may be attributed the absence of smallpox on vessels, especially among the crew. None of the smallpox cases detected during the year were members of the crew.

The card system, adopted four years ago, has proved very satisfactory. Red cards are given when a person is vaccinated for the first time, and if a "take" is found on inspection, a blue card is issued, which exempts the holder from revaccination. If the first vaccination does not "take," the person is revaccinated and given a white card, and if the second vaccination does not "take," he is vaccinated a third time, and a fourth if no "take," and then given a blue card, with an indicator that four vaccinations have proved unsuccessful. Such persons are revaccinated about every six months until a "take" is obtained, when a blue "successfully vaccinated" card is issued.

No better proof as to the efficacy of vaccination exists than in the Philippine Islands. Provinces which from time immemorial have had from 2,000 to 6,000 deaths from smallpox every year have not had a single death from this cause since their vaccination was completed more than a year ago.

LEPROSY.

No cases of leprosy were detected at the quarantine inspection of incoming ships. The vessels used by the bureau of health in transporting lepers to the Culion leper colony were thoroughly disinfected on three different occasions at the Mariveles quarantine station. It is believed that the systematic inspection which is made of vessels that arrive at ports of entry to a large extent deters lepers in the Philippines from traveling from island to island, and in this way the efforts of the bureau of health in eradicating this disease are greatly aided.

VESSELS BOARDED.

There were 6,444 incoming vessels inspected upon arrival at the ports of entry of the Philippine Islands. At Manila, 3,193 vessels were boarded; at Iloilo, 1,198; at Cebu, 1,855; and at the other ports of entry, 198. This is a decrease from last year's figures of 73 vessels at Manila, and a decrease of 1 vessel at the other ports of entry—a total decrease of 74 vessels. Last year the total number boarded was 6,518. This does not mean that less vessels arrived at ports of entry, but that more vessels were exempted from inspection. At Jolo and Zamboanga only vessels arriving directly from foreign ports are inspected. At Iloilo, vessels arriving from near-by Panay and Negros ports are allowed to come in and go out of port without any restrictions. At Cebu, vessels from the island of Cebu are treated as ferryboats, and do not await quarantine inspection or carry bills of health. At Manila, army transports carrying surgeons and vessels arriving from Subic and Olongapo are not subject to quarantine inspection.

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Vessels at all ports controlled by the service are boarded from sunrise to sunset, and later in the evening when the occasion demands and such procedure is deemed safe. Vessels coming to Manila can secure pratique at Mariveles up to sunset, thus making the boarding hours at Manila in effect from sunrise to 9 p. m. It is hoped that the health conditions in the islands will remain as favorable as they are at present, and that the inspection upon arrival of interisland vessels can be discontinued. Their sanitary condition in that event would be supervised by frequent inspections while at their berths, and the inspection of some vessels on arrival would be continued until such time as they are maintained clean and sanitary.

VESSELS DISINFECTED.

There were disinfeced at Manila 79 vessels, at Iloilo 2 and at Cebu 4.

Four vessels were disinfected on account of cholera, 6 on account of smallpox, 3 on account of being employed in transporting lepers to the Culion leper colony; 1 for scarlet fever, 1 on account of cerebro-spinal meningitis, and the remainder because they came from infected ports, from drydocks at Hongkong or Singapore, or were proceeding to United States ports.

The disinfection of infected vessels and the treatment of crews and passengers met with the same success as heretofore. Not one secondary case of any quarantinable disease occurred among the personnel detained.

Three Navy vessels were disinfected at the request of the admiral commanding the Asiatic Fleet—the *Chattanooga*, on account of repeated cases of smallpox occurring on board, and the first-class cruiser *Maryland*, throughout, on account of cerebro-spinal meningitis which prevailed on the ship. No further cases occurred after the disinfection. The U. S. S. *General Alava* was disinfected on account of smallpox.

Vessels bound for the United States and carrying steerage passengers have been partially disinfected, the crews and steerage passengers bathed, and their effects disinfected.

The regular army transports leaving Manila for the United States were all partially disinfected. Vessels from the China coast, where no officer of the service is stationed, are required to call at Mariveles for such disinfection as seems to be indicated.

There has been a decrease in the number of vessels infected with quarantinable diseases as compared with former years. For the fiscal year 1905 there were 28; for 1906, 23; for 1907, 14.

The extensive vaccination operations of the bureau of health and the service rules with regard to crews being vaccinated has reduced to a minimum the liability of smallpox occurring on vessels, and consequently was an important factor in lessening the number of infected vessels.

FUMIGATION OF VESSELS.

The large number of vessels from plague-infected ports which call here and often are en route to the United States and foreign countries, and which are either partially or completely laden with cargo consisting of tea and other freight which might be damaged by sulphur or other gases recommended by the quarantine regulations for the destruction of vermin, has brought to the attention of this office in a forcible manner the desirability of seeking for another gas which will destroy vermin without endangering cargo, and at the same time be cheaply and easily generated without endangering the lives of the crew or others while the process is being carried out. This problem is constantly becoming more important, as far as Manila is concerned, because wharves at which deep seagoing vessels can go alongside are now actually under construction, so that before another year has passed the opportunity for rats and vermin finding their way ashore will be vastly increased. Often vessels arrive here which it would be most desirable to fumigate, but the nature of their cargo is such that fumigation with sulphur would be attended with considerable risk, and the amount of the cargo is such that the cost of unloading it would be prohibitive. If a safe gas which would destroy vermin could be used with the cargo remaining in the hold, undisturbed, it is believed that a long step in advance would be made in preventing a disease like plague gaining admission to a country. It is understood that at Marseille and at German ports carbon monoxide and carbon dioxide have been used with considerable success. The Public Health and Marine-Hospital Service at Washing-

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ton has been requested to investigate this matter, and it is hoped that the result of the work will soon be available.

The plan of fumigating all vessels engaged in the interisland traffic once every six months has been continued. Owing to this constant fumigation the number of rats on interisland vessels has been so reduced that it is very seldom that more than a dozen are found even on large vesels after the fumigation, and for this reason the period between fumigations has been gradually lengthened, once a year in many cases being ample. The latter policy was pursued until the reappearance of plague along the nearby China coast, and accounts for the smaller number of fumigations for the year. Since plague has been so close a constant vigilance has been exercised to keep the vessels plying between Philippine ports as free as possible from rats and vermin. There were 161 vessels fumigated during the year—116 at Manila, 14 at Iloilo, and 31 at Cebu. Vessels from plague-infected ports are fumigated on arrival at Philippine ports. Ships from plague centers coming to Philippine Island ports and bound for the United States are fumigated here to kill the vermin on board before taking cargo. Vessels on the Hongkong-Manila run are now fumigated at Hongkong instead of at Manila. The work of fumigation has been conducted without friction or complaint during the year, and has the support of the shipping interests, and also the traveling public.

CARGO.

The same requirements and regulations which have been in force during the past two years with regard to imported cargo were continued in force. Vegetables which for commercial reasons must be thoroughly dry before they are shipped—such as potatoes, onions, garlic, etc.—are permitted to be landed when they are certified as having been grown in noninfected districts. Vegetables which are eaten raw—such as cabbage, celery, lettuce, etc.—are not allowed to be shipped to Philippine Island ports unless from the United States. These regulations encounter very little opposition, because the prohibition against their entrance during the past few years so stimulated the home industry that sufficient of this class of vegetables is now grown in the islands, and there is no longer a large demand for the foreign products, the fresher home-grown article being preferred.

The master of every vessel arriving from a foreign port signs a statement added to the quarantine declaration that he will land no ship's stores without a permit from the quarantine office. This procedure was necessary on account of all kinds of articles and produce liable to convey infection being forwarded in care of a member of the crew as "ship's stores," and then landed at Philippine Island ports on the first favorable opportunity. This procedure has made considerable additional work, but has accomplished a vast amount of good by absolutely controlling everything landed in the islands. The customs authorities assist the service in the enforcement of this regulation, and the plan has worked very successfully.

The shipment of various cargoes between interisland ports has also received considerable attention. For economical purposes the service supervises the shipment of hides, lard, fresh-fish products, and similar commodities from Manila to the provinces, and from the provinces to Manila. Thousands of permits for such cargo were issued during the year, and numerous visits to factories and fish-packing places have been made to enforce proper sterilization of animal foodstuffs and to identify particular shipments.

OUTGOING QUARANTINE.

The constantly increasing commerce and travel between the Philippine Islands and the United States naturally increases the work of supervising the shipment of cargo and the treatment of personnel and their effects. In order not to interfere with the efforts to increase commercial relations and to popularize these much-maligned islands, it is necessary that this work, while performed in conformity to existing laws and regulations, be accomplished with as little friction or annoyance as possible. If the present favorable health conditions continue to prevail, it is hoped that much of the present inspection and disinfection may be discontinued in the near future. Extensive treatment and disinfection of ships and personnel bound to the United States naturally gives the impression abroad that the islands are badly infected and that the real facts are being suppressed.

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During the larger part of the year, on account of cholera being present in the islands, special precautions were taken, and until October 22, 1906, sailing vessels bound for the United States, on account of the possibility of their being rendered helpless if a few members of the crew were seized with this disease, were held five days under observation before sailing.

Seventy-nine vessels coming under the provisions of the United States quarantine laws and regulations were granted consular bills of health for ports on the mainland of the United States, or on its insular possessions. Eighteen of these vessels were partially disinfected. Nine were fumigated throughout before bills of health were issued.

Army transports—17 in number—were partially disinfected, their crews and steerage passengers bathed, and their effects disinfected. They carried a total of 3,213 crew, 1,869 cabin passengers, and 5,633 steerage.

All vessels proceeding to United States ports, including the crew and passengers, were inspected prior to sailing, and the bills of health completed on board the vessels. All ship's manifests were visèed after being compared with the boat notes, and permits for loading cargo issued by the office staff after due inspection and investigation before the cargo was loaded on the vessel.

During the year 27,270 pieces of baggage were disinfected and 26,291 passed after inspection, making a total of 53,561 pieces of baggage treated and labeled according to the regulations.

In addition, the source, condition, and liability to convey infection of 409,630 pieces of miscellaneous cargo were investigated and certified before being allowed to be loaded on vessels bound for the United States. In the inspection, 2,421 pieces of cargo were required to be disinfected, and in a large number of cases permits for shipment were refused. The investigation and certification of cargo and effects for shipment to the United States imposes a vast amount of difficult and exacting office and outdoor work on the personnel of the service. The work has been accomplished very satisfactorily, and no complaints have been heard regarding the manner or promptness in which the same is conducted.

NONQUARANTINABLE DISEASES OBSERVED ON VESSELS.

On arriving vessels among the crew and passengers almost every ordinary disease has been observed during the past year. The trans-Pacific liners and transports are generally from twenty-three to thirty-five days out from San Francisco, or other Pacific coast ports, and always have a large hospital list, and not infrequently a number of deaths. A majority of the orientals returning from San Francisco to China via Manila are old, sick, or crippled men, who are returning to their birthplaces to spend their remaining days in order to die in their own country. This custom greatly increases the number of sick and usually augments the death list. Among the specific infectious diseases noticed were scarlet fever, diphtheria, typhoid fever, pneumonia, measles, mumps, cerebro-spinal meningitis, and tuberculosis. Many of these diseases often resemble some of the quarantinable diseases, so that a diagnosis is often difficult, as well as one of considerable responsibility.

The number of cases of sickness found among the members of the crews of interisland vessels has gradually diminished during the past four years. The effects of the constant fight against insanitary conditions on vessels has so improved the crew's living quarters that many diseases have practically disappeared. When the service began to inspect vessels in the islands, skin diseases were found in almost every occupant of the forecastle, and beri-beri was present in a large percentage of the vessels. Now, skin diseases the result of filth and insanitary quarters are practically absent, and beri-beri is seen very seldom. The frequent fumigation of the forecastles with sulphur dioxide gas and the subsequent painting rendered necessary has improved the sanitary condition of the crews' quarters, and the better quality of the food now used has no doubt had effect in lessening disease.

AID TO OTHER SERVICES.

1. *Board of marine examinations.*—The examination of candidates for license as masters, mates, and engineers on American vessels in the islands, under the provisions of act 780, has again been conducted by the service during this year. The examination, as previously reported, is a complete physical examination, and corresponds to the examinations made by boards of medical officers in the United States of candidates for officers in the Revenue-Cutter, Life-Saving, and similar services.

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During the year 445 examinations were made, 366 persons having been passed, 45 rejected, and 44 given provisional certificates.

2. *Immigration service.*—The officers of the service on quarantine duty at the ports of entry inspected 7,708 aliens, and certified 96 as being afflicted with excludable diseases, or conditions which would affect their ability to earn a living. Of the number certified, 45 were deported, 6 released, and 45 remain in the islands at the close of the year awaiting decision of appeals or deportation.

3. *Bureau of health.*—Vessels in port and in the river were disinfected on account of diseases occurring thereon. Water transportation was furnished for carrying out a number of important functions of the sanitary work in the river and bay. Hides, animal food products, etc., were certified for landing and shipment.

4. *Bureau of education.*—At the request of the director of education, students bound for the States to complete their education, some at private expense and others at government expense, were given a rigid physical examination before being finally appointed to scholarships.

5. *Bureau of navigation.*—Officers and men are examined to determine their fitness for promotion, or for appointment to positions in the coast guard, or light-house service, either as officers, cadets, or keepers. Cutters and launches were disinfected and fumigated.

6. *Coast and geodetic survey.*—One physical examination was made of an employee of that service.

7. *Bureau of posts.*—During the outgoing quarantine, the post-office bureau was extended every aid practicable, both at Manila and Mariveles, for the expeditious shipment of mail. Incoming mail steamers were boarded out of regular hours and mail allowed to be landed.

8. *Bureau of civil service.*—Special physical examinations were made at the request of the civil-service board of applicants for certain positions. Examination papers were examined and rated.

9. *Panama Canal Zone.*—Household goods and baggage bound for the Canal Zone were inspected and passed, or disinfected and certified. Travel to the Zone being via the States, much of the cargo destined for the Zone is treated with the other cargo being shipped to the United States.

10. *Weather bureau.*—Storm signals are displayed at the quarantine station at Mariveles, as directed by wire from the Manila Observatory. This service is greatly appreciated by the shipping, because Mariveles Bay is a safe and much-used refuge for vessels when typhoons are threatening.

11. *United States Army.*—Transports were disinfected when requested on account of measles or other minor communicable diseases being aboard, and fumigated when desired. Launches were fumigated to rid them of vermin.

12. *United States Navy.*—Three vessels were disinfected, including one of the largest in the Navy. One vessel was held under service observation for fourteen days at the request of the naval authorities.

13. *Bureau of Agriculture.*—Upon request of the bureau of agriculture, vessels which have carried diseased cattle have been regularly disinfected.

INTERISLAND QUARANTINE.

At the beginning of the fiscal year 1907 an outgoing quarantine of two days was imposed at Manila on all vessels leaving the port for other interisland ports, except those near Manila, in order to prevent, if possible, cholera from being conveyed by vessels from Manila to other Philippine Island ports. In view of the experience gained in former epidemics of cholera, and in order to reduce the interference with and delays to shipping as much as possible, everything commensurate with safety was done to lessen the detention period and to expedite the departure and arrival of vessels. The quarantine detention was served by vessels in Mariveles Bay, the work of inspection being done by the officers on duty at the Mariveles quarantine station. Cholera occurred on three vessels while in detention prior to sailing. Vessels and personnel were disinfected and held for five days. No secondary cases occurred.

Beginning August 14, 1906, vessels proceeding to ports at which army medical officers were stationed and were permitted to act as quarantine officers by the commanding general, Philippines Division, were allowed to leave Manila without quarantine, the voyage to count as the quarantine period, with a rigid inspection at the first port of call.

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On October 3, 1906, the detention period was reduced from two days to twenty-four hours for the majority of vessels. For vessels bound for ports at which service quarantine officers were stationed no detention was required before sailing.

On November 10, 1906, all outgoing quarantine restrictions at Manila were removed, except that vessels were required to obtain bills of health on which a certificate was placed, signed by the master of the vessel, agreeing to return at once to a quarantine station if suspicious illness occurred on board, and not to allow prohibited foodstuffs to be brought aboard his vessel either by crew or passengers.

After May 1, 1907, masters of vessels commencing a voyage from one port in the Philippine Islands to another in the Philippine Islands were not required to obtain bills of health, thus removing all quarantine restrictions on outgoing vessels.

At Iloilo an outgoing quarantine of three days was imposed on September 14, 1906, and continued in force, with modifications to meet the local conditions, until November 5, 1906.

As soon as conditions warrant, it is hoped that the inspection of interisland vessels, upon their arrival at ports of entry, may be discontinued.

The circular letters[a] embodied in this report outline in considerable detail the outgoing quarantine measures and regulations which it was necessary to promulgate, both at Manila and Iloilo. At Cebu no outgoing interisland quarantine was imposed during the year.

FLOATING EQUIPMENT.

The 6 vessels purchased for the service in the Philippines—4 launches and 2 barges—were in commission all the year. The launches *Zapote* and *Mercury* were stationed at Manila, the former as the regular quarantine boarding launch and the latter as a relief boarding boat. The two launches are operated by a crew of 11 men. Both launches have rendered excellent service, and are in good condition.

The launch *Mariveles* and the two disinfecting barges, *Esmeralda* and *Proteccion*, are stationed at Iloilo. The latter was removed from Cebu to Iloilo, because the completion of the Cebu quarantine station made the continuance of a disinfecting barge at Cebu unnecessary. The launch was in commission all the year, except a few weeks while the boiler was being retubed. The barge *Esmeralda* needs a new rudder, but otherwise is now in good condition, the keel and hull having been thoroughly repaired during May, 1907. The barge *Proteccion* was used to good advantage during the late epidemic of cholera and the outbreak of typhoid fever among the troops at Iloilo. The extra barge at Iloilo is held in reserve, and is available for use at any time should occasion arise requiring a disinfecting plant at any of the other ports in the islands. The plant will be left at Iloilo, safely berthed in the river until it is needed elsewhere.

The launch *Sanidad*, at Cebu, was recently repaired, including a new propeller shaft. The vessel is in good condition, and is used as a supply boat for the Cebu station, as well as a boarding boat.

The floating equipment was very economically administered. The many severe storms which prevailed fortunately did no serious damage to any of the vessels of the service. No large repairs were necessary, and none but minor repairs for the proper care and preservation of the several vessels and their equipment are anticipated for the coming year.

QUARANTINE STATIONS.

The disinfection and detention station at Mariveles was found equal to all demands made upon it. During the continuance of the outgoing interisland quarantine the station and bay were a scene of considerable activity. The station buildings have been kept in good repair by the employees of the station. The main wharf was extensively repaired during the period from July to December, 1906; and during June, 1907, the bureau of public works began the renewal of over 100 piles in the body of the main wharf and in the clusters of fender piles along its front. Creosoted pine piles are being used.

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[a] These have been omitted, and are on file in the Bureau of Insular Affairs, War Department.

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The incendiary fire, which destroyed the major portion of the adjacent village of Mariveles, did not do any damage to the station. The structures at Mariveles suffered no serious damage during the severe typhoons which prevailed during 1906. Several of the wooden buildings are becoming old and will not much longer withstand the elements. They should be replaced with stone buildings, and, since an inexhaustible supply of good stone is available on Mariveles Bay, the project is a very feasible one.

The station at Cebu is the headquarters of the service at that port. The office of the service is located on Cauit Island, and the boarding of incoming vessels is conducted from the station. The buildings have been maintained in a good state of repair and preservation. The equipment of the station is now practically complete, and for adaptability and efficiency the Cebu station ranks with any in the service.

IMMIGRATION.

There were 7,708 aliens inspected by officers of this service at ports of entry in the Philippine Islands. Of this number, 6,873 were inspected at Manila, 379 at Iloilo, 107 at Cebu, 154 at Zamboanga, and 195 at Jolo, with 88 rejections at Manila and 8 at Iloilo. Of the total of 96 certifications, there were deported 45; pending action of court, 45; released, 6.

The total number inspected for the year is larger than at any time since the medical inspection of aliens was commenced in the Philippine Islands in 1903, but this does not necessarily mean that there has been a larger immigration than in previous years. Until January 1, 1907, it was held in the Philippine Islands that Chinese did not come under the provisions of the immigration act of 1903, and, consequently, they were not inspected from the immigrant standpoint. Since January 1, 1907, however, the Philippine authorities have held that they did come under the provisions of the immigration law, and since this latter date there have been 3,474 Chinese inspected, which would indicate that the actual number of aliens entering the country, calculated upon the same basis as in former years, was 4,334. The largest number reached heretofore was in 1904, when 6,111 were recorded.

During the first few weeks in January the percentage of rejections among the Chinese was very high, but as soon as the steamship companies understood that they would be fined if they brought aliens to ports in the Philippines with diseases that could have been detected at port of embarkation, they immediately made arrangements with private physicians to have such alien passengers inspected prior thereto. The effect of this action was immediately noticeable, there having been a steady reduction. During the month of June the percentage of rejections was very small.

The causes of rejections were: Trachoma, 87; poor physique, 2; hernia, 1; senility, 1; syphilis, 5. The percentage of rejections was 0.01¼, which compares very favorably with the figures reached in former years, especially when it is considered that the number was unusually increased during January, 1907, by the sudden application of the law against Chinese not being immediately understood.

The statistical tables[a] for the year are submitted herewith under the station to which they pertain.

EXPENDITURES.

At the close of the fiscal year 1906 all unexpended balances, amounting to ₱4,894.64 Philippine currency, reverted to the insular treasury. Fiscal year 1906 funds to the amount of ₱27,855.56 were transferred to fiscal year 1907 funds for the liquidation of the obligations of the fiscal year 1906 remaining unpaid June 30, 1906. The general appropriation for the fiscal year 1907 was ₱125,000, to which refunds to the amount of ₱4,764.50 were made, making a total of ₱157,620.06 available for expenditure during the fiscal year 1907, of which ₱27,855.56 were for obligations of the fiscal year 1906, and ₱128,764.50 for fiscal year 1907 authorizations.

The disbursements were ₱115,196.30. The total expenditures authorized by the service amounted to approximately ₱153,298.06, leaving an unexpended balance of about ₱4,222. The latter amounts may not be strictly accurate, because the bills for supplies ordered from the United States by the bureau of

[a] These tables have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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supply have not been received, and until the freight, landing charges, etc., are known, exact figures can not be given. These authorized expenditures include all expenses of the maintenance and operation of the service, as well as those for repairs and improvements.

The financial statement submitted at the end of this report shows in considerable detail the purpose for which the funds were expended and the stations for which the expenditures were authorized.

ILOILO.

At Iloilo all incoming vessels have been subject to inspection, except those from Panay and Negros. The sanitary condition of the interisland vessels is gradually improving, but there is yet much to be done. Were it not for the constant surveillance of the service over these vessels, it is believed that it would be next to impossible to travel on them with any degree of comfort or safety.

All the interisland vessels plying in and out of this port were fumigated once during the year to free them from rats and vermin. Steamers from plague-infected localities are treated with great care, in order to prevent rats from coming ashore from them. Rat guards are used on all lines, and at night the gangplanks are removed and vessels are eased away from the wharf. When this can not be successfully effected, vessels are required to lighter their cargoes in the bay.

One vessel was treated which had cholera on board. After the usual disinfection and detention no further cases occurred.

The vaccination of crews was continued, and to this procedure is no doubt due the fact that no smallpox-infected vessels entered the port of Iloilo.

A mild outbreak of cholera occurred in and about Iloilo during September, 1906, and an outgoing quarantine was instituted September 15 of that year on all vessels leaving Iloilo for other ports in the Philippines, except Manila, to prevent the spread of the disease to the adjacent and other islands of the archipelago. This quarantine, with such modifications as were deemed safe, was continued in force until November 28, 1906. The detention proved eminently successful, as no cases were carried from Iloilo to other places. From the northern part of the province cholera was carried to Negros by a sailing vessel.

The measures instituted for the management of the outgoing quarantine are outlined in considerable detail in the circular letters which were issued from time to time at Iloilo and copies of which are embodied in this report.[a]

CEBU.

The only quarantinable disease encountered at Cebu was a case of smallpox imported on the British steamer *Mazagon*. The usual treatment was given the vessel and personnel, and no spread of the disease from the vessel or its crew occurred.

The vaccination of the crews of interisland vessels was continued, and it is encouraging to note the absence of smallpox from among that class of persons. In former years it was no uncommon sight to see an entire crew marked from having had smallpox.

During the presence of cholera in Manila and Iloilo in more or less epidemic form considerable anxiety existed at Cebu lest cholera should again be introduced at that port. The efforts of the service fortunately met with success, and no cases of cholera occurred in Cebu.

Vigorous measures were instituted against vessels from plague-infected ports. All such vessels were required to use rat guards while at the wharf and to unload only during daylight. They were fumigated in order to destroy the rats and vermin on board, it being a well-established fact that measures which destroy rats and vermin prevent the spread of plague.

The station at this port clearly demonstrated its adaptability and efficiency in the treatment of a number of large vessels from infected ports.

At Cebu all arriving vessels except those from near-by Cebu ports are inspected on arrival. The masters of the vessels are slowly realizing under constant instruction and pressure that it is of vital importance that they maintain their ships in a clean and sanitary condition.

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[a] These have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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Arriving aliens were examined in accordance with the immigration laws and regulations.

Thirty-seven masters, mates, and other officers of coastwise vessels were physically examined, in accordance with the provisions of act 780, and 4 were found to have defects which would unfit them for the positions for which they sought licenses.

CAVITE AND OLONGAPO.

At the naval stations at Cavite and Olongapo surgeons of the Navy are detailed as quarantine officers, and carry out the United States quarantine laws under the direction of the chief quarantine officer for the Philippine Islands. The quarantine work was done in a very commendable manner, and the convenience resulting by having the inspections made at the naval stations instead of at Manila was much appreciated by the Navy.

At Cavite 18 vessels of the Navy, either regular naval vessels or chartered, arrived from foreign ports, were inspected, and granted pratique upon arrival. Smallpox occurred on two cruisers, and cerebro-spinal meningitis made its appearance on the *Maryland*, and all 3 vessels were remanded to Mariveles for disinfection.

At Olongapo 13 vessels, including the dry dock *Dewey*, arrived from foreign ports, and were inspected in the usual manner. No infected vessels arrived at Olongapo. During the cholera epidemic vessels from infected Philippine ports were also inspected by the quarantine officer at Olongapo to protect the garrison of marines there.

The tables of statistics of the work done at Cavite and Olongapo are submitted on the following pages.[a]

ZAMBOANGA.

The inspection station at Zamboanga has increased considerably in importance. Zamboanga is the commercial center for the immense island of Mindanao, which is now pacified, and the increase of peaceful pursuits, together with the presence of a larger body of troops, has increased its trade. Several lines of large steamships now make Zamboanga a port of call, and a number of vessels from foreign ports call there after making a call at Manila, Iloilo, or Cebu. Only those vessels which arrive directly from foreign ports are inspected by the acting assistant surgeon in command.

During the year 62 vessels from foreign ports were inspected. They carried 4,472 crew and 1,490 passengers. No infected vessels arrived, and while cholera was present in other Philippine ports, the quarantine officer also inspected interisland vessels for the protection of the army, of which he is an officer.

One hundred and ninety-five aliens arrived and were inspected according to the rules of the service and the immigration laws. No aliens were certified as being afflicted with excludable diseases, or infirmities which would affect their ability to earn a living.

JOLO.

At the port of Jolo, which is the port of entry of the Sulu Archipelago, only vessels arriving directly from foreign ports are inspected by the service. No lines of steamers make Jolo a regular port of call. The trade is mostly with vessels from Borneo, the Celebes, or Singapore.

Seventeen vessels directly from foreign ports arrived, and were inspected in accordance with the United States quarantine laws and regulations. No infected vessels arrived.

The service operations were in charge of Acting Asst. Surg. Chas. B. Ewing, major and surgeon, U. S. Army.

During the year 154 immigrants arrived and were inspected, in accordance with the United States immigration laws and regulations. No diseases or conditions requiring certification were detected.

The port of Jolo has remained free from quarantinable diseases, and with the exception of a few cases of smallpox, the surrounding country and islands have continued in a satisfactory sanitary condition.

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[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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SUMMARY OF QUARANTINE TRANSACTIONS AT MANILA, P. I., DURING THE FISCAL YEAR ENDED JUNE 30, 1907.

Total number of vessels inspected	3,472
Total number of vessels detained in quarantine	411
Total number of vessels disinfected	63
Total number of vessels fumigated to kill vermin	116
Total number of bills of health issued	2,771
Total number of pieces of baggage disinfected	43,884
Total number of pieces of baggage inspected and passed	30,414
Total number of pieces of miscellaneous cargo certified	319,639
Total number of cases of quarantinable diseases detected on vessels:	
Cholera	3
Smallpox	3
Total number of persons detained in quarantine	23,403
Total number of crew inspected	153,141
Total number of passengers inspected	92,445
Total number of persons vaccinated	4,099
Total number of persons bathed and effects disinfected	15,942

GRAND SUMMARY OF THE QUARANTINE TRANSACTIONS IN THE PHILIPPINE ISLANDS BY THE U. S. PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE DURING THE YEAR ENDED JUNE 30, 1907.

Total number of vessels inspected	6,941
Total number of vessels detained in quarantine	621
Total number of vessels disinfected	69
Total number of vessels fumigated to kill vermin	161
Total number of bills of health issued	3,548
Total number of pieces of baggage disinfected	44,452
Total number of pieces of baggage inspected and passed	30,452
Total number of pieces of miscellaneous cargo certified	409,630
Total number of cases of quarantinable diseases detected on vessels:	
Cholera	4
Smallpox	4
Total number of persons detained in quarantine	26,748
Total number of crew inspected	257,935
Total number of passengers inspected	128,931
Total number of persons vaccinated	4,785
Total number of persons bathed and effects disinfected	16,374

FINANCIAL STATEMENT.

RECEIPTS AND EXPENDITURES, QUARANTINE SERVICE APPROPRIATIONS, PHILIPPINE ISLANDS, EXPRESSED IN PHILIPPINE CURRENCY.

I.

(A) GENERAL APPROPRIATION, BUREAU OF QUARANTINE SERVICE.

Balance, former fiscal year appropriations	₱27,855.56	
Appropriation, act No. 1527, fiscal year 1907	125,000.00	
Collections available for expenditure	4,764.50	
Total available	157,620.06	
Expended during the fiscal year 1907		₱113,776.29
Unexpended balance June 30, 1907		43,843.77
Total		157,620.06

(B) APPROPRIATION FOR PUBLIC WORKS AND PERMANENT IMPROVEMENTS.

Balance appropriation, act No. 1342, Cebu quarantine station	₱3,009.27	
Total available	3,009.27	
Expended during the fiscal year 1907		₱1,420.01
Unexpended balance		1,589.26
Total		3,009.27

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II.

STATEMENT OF FUNDS EXPENDED DURING FISCAL YEAR 1907.

Expended from general appropriations	₱113,776.29
Expended from public works appropriations	1,420.01
Total expended	115,196.30

III.

EXPENDITURES.[a]

IV.

TOTAL EXPENDITURES FOR THE QUARANTINE SERVICE IN THE PHILIPPINE ISLANDS, JULY 1, 1906, TO JUNE 30, 1907.

Compensation of personnel	₱72,931.34
Office and general service expenses	3,093.71
Launch and barge supplies and repairs	12,492.94
Station supplies and disinfectants	11,266.12
Repairs to buildings and wharfs	12,634.75
New construction and new equipment	2,777.44
Total expenditures, Philippine currency	115,196.30

V.

EXPENDITURES AS PER CLASSIFICATION ADOPTED BY THE PHILIPPINE COMMISSION.

1. Real estate	
2. Permanent improvements	₱3,416.41
3. Supplies (in 2, 4, and 7)	
4. Administration, salaries, and wages	72,667.34
5. Administration, miscellaneous expenses	19,937.28
6. Maintenance, salaries, and wages	264.00
7. Maintenance, miscellaneous expenses	18,911.27
Total	115,196.30

VI.

APPROPRIATIONS FOR THE BUREAU OF QUARANTINE SERVICE AVAILABLE FOR THE FISCAL YEAR ENDED JUNE 30, 1907, WITH EXPENDITURES AND BALANCE, PHILIPPINE CURRENCY.

Title of appropriation.	Amount of appropriation available.	Expenditures.
Former fiscal years, administration expenses	₱27,855.56	₱15,799.72
Act No. 1527, administrative expenses	129,764.50	97,976.57
Act No. 1342, Cebu quarantine station	3,009.27	1,420.01
Total	160,629.33	115,196.30

Unexpended balance, June 30, 1907	₱45,433.03
Retained against outstanding obligations, etc	45,433.03

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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VII.

EXPENDITURES BY STATION.

MANILA.

General service expenses	₱27,700.36	
Launch expenses	12,613.85	
New station equipment	0.00	
		₱40,314.21

MARIVELES.

General service expenses and supplies	28,683.99	
Repairs to buildings and wharfs	12,239.93	
New construction and equipment	1,027.82	
		41,951.74

ILOILO.

General service expenses	5,385.53	
Launch and barge expenses	8,019.00	
New station equipment	0.00	
		13,404.53

CEBU.

General service expenses	10,164.02	
Launch expenses	5,867.93	
Repairs to buildings, wharf, and reservation	452.55	
New construction and new equipment	1,461.32	
		17,945.82

JOLO.

General service expenses	360.00	
		360.00

ZAMBOANGA.

General service expenses	1,220.00	
		1,220.00
Total expenditures		115,196.30

Respectfully submitted.

VICTOR G. HEISER,
Passed Assistant Surgeon,
Chief Quarantine Officer for the Philippine Islands.

To the SECRETARY OF THE INTERIOR,
Manila, P. I.

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APPENDIX C.

REPORT OF THE DIRECTOR OF FORESTRY.

DEPARTMENT OF THE INTERIOR,
BUREAU OF FORESTRY,
Manila, P. I., June 30, 1907.

SIR: I have the honor to submit herewith a report of the work of the bureau of forestry for the period July 1, 1906, to June 30, 1907.

The work during the past year has progressed much more satisfactorily than in former years. With two exceptions the foresters have completed two years of service in the districts under their charge, and all will continue service in that part of the islands now so well known to them. It takes a forester at least one year to make one thorough inspection of his district where logging operations are being conducted.

REPORT OF THE FORESTERS' CONFERENCE.

The second annual conference of the foresters of the Philippine bureau of forestry was held recently in Manila. This annual conference of the directing members of the service following the close of each fiscal year is becoming more useful and necessary each year in settling the forest problems which arise in the different districts. The discussion of forestry questions at this conference resulted in many recommendations for the betterment of the service. The director of forestry presided at the meeting and opened the conference with an address on the work of the bureau, reviewing the former instructions given to the foresters and expressing his satisfaction on the amount of work done during the year.

The following foresters were present: Messrs. William Klemme, Theo. Zschokke, H. M. Curran, William H. Kobbe, F. L. Pray, M. L. Merritt, and H. D. Everett. Messrs. Whitford and Hutchinson were unable to attend, the former being absent on a vacation in the United States and the latter being engaged in an important piece of field work in Mindanao.

Each forester read his annual report, which was a progress report showing what had been done in his district during the past fiscal year. These were especially interesting, as the past year was the first entire year's work done by them since the reorganization of the bureau in 1905, which made the work of the bureau more technical than administrative. The reports showed what had been done and how it had been done, naturally causing much valuable discussion. In spite of the many difficulties encountered by the foresters the amount of work of permanent value accomplished was gratifying.

All reconnoissance sketch maps were left by each forester in the map section for compilation, as well as information concerning means of communication in their districts.

All applications for licenses for the coming year were submitted, with recommendations in each case.

A programme for the conference arranged the order in which the topics for discussion would be taken up.

The conference then proceeded to discuss in detail all phases of the present work, criticising methods and making many suggestions to increase the efficiency of future work.

Representatives of the bureau of internal revenue, bureau of lands, bureau of science, and of the Manila lumbermen were present when matters concerning their work were discussed.

Considerable attention was given to devising means of securing a competent Filipino force to carry on the work which is becoming more technical. As the establishment of a regular training school for rangers is at present impracti-

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cable it was decided to secure student assistants from the public schools, preferably the trade schools, who, after they have shown their capacity and fitness, shall enter the service as rangers.

The most important work accomplished by the conference was the reorganization of the field work of the bureau. The title of the division of forest products was changed to the division of forest investigation, and a new division was organized, to be known as the division of forest administration. Each division is under the charge of a committee of three foresters which plans its work. The division of forest administration, with a force of 6 foresters and about 18 rangers will take charge of the administrative work, such as pertains to licenses, violations of the forest act, etc., and will also do as much special work of investigation as possible in cooperation with the division of forest investigation. The division of forest investigation, with a field force of 3 foresters and 3 rangers, will carry on special studies and make special maps in all parts of the islands. By this new organization it is expected that the work can be done in a more systematic manner.

The privilege of the free use of timber which was granted to the residents of the islands October 19, 1905, for a period of five years, was discussed in great detail. In addition to the opinions of the foresters on the question, letters were read from important lumbermen dealing with this privilege. The conference decided that the privilege as granted, without regulation or restriction except regarding first group timber, not only made proper administration of the forest most difficult, but tended to establish a servitude or forest right which would be found almost impossible to abolish after the lapse of years.

Homesteads and caiñgins (clearings) were thoroughly discussed as usual. It was decided that radical changes were necessary. Permits should no longer be required for caiñgins on private lands. On public lands few or no caiñgins should now be granted. People desiring to make caiñgins should be required to make out homestead applications for the land. In this way the bureau will encourage permanent occupancy of small farms instead of shifting cultivation within the forest regions.

Interesting additional recommendations which were discussed and adopted show the character of the conference.

1. That the map work be pushed during the coming year in view of its importance at this time. The principal mapping will be the land classification or plat maps. In addition a beginning will be made in establishing boundaries for possible future reserves, detailed surveys to be made of a few important cutting areas.

2. That every possible effort be made to assist Doctor Foxworthy, of the bureau of science, by means of data and wood specimens, in making a definite key for the determination of Philippine woods.

3. That collections of botanical, wood, and other museum specimens be continued, but made with the least possible expense. That seeds of the important trees be collected to be used in nursery experimentation work on the Lamao forest reserve by Mr. Cuzner, of the bureau of agriculture.

4. That identified railroad ties of the following species be secured and placed in the track in cooperation with the Philippine Railway Company, in order to secure definite information regarding their durability and fitness for this use: Toog, dao, apitong, amuguis, cubi, banuyo, malaruhat, agoho, supa, palo, maria, and banaba.

5. That durability tests of Philippine timbers going into construction work be made whenever possible.

6. That the effort to introduce new species of timber into the markets be continued.

7. That a strenuous effort be made to amend act No. 1407, so that the free use of lower group timber shall be regulated by the bureau of forestry.

8. That permits be no longer required for clearings on private lands adjoining the public forests.

9. That permits for caiñgins in the public forests no longer be given, and that their place be taken by homesteads.

10. That in order to encourage the utilization of small logs, which should be removed from the forest, each forester certify to the bureau of internal revenue those timber licensees in his district who can be depended upon to cut small logs without felling trees below the diameter limit imposed.

11. That each forester study the minor products collected in his district and their market value in order to assist the bureau of internal revenue in imposing a specific tax on those forest products.

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12. That efforts be made to introduce American saws, axes, engines, wire cables, and other logging tools.

13. That timber licensees be required to mark their timber in the forest with their own special mark.

14. That exclusive two-year timber licenses be granted to responsible lumbermen when their cutting areas have been mapped and roughly studied by a forester.

15. That foresters inspect personally the cutting areas of large operators, leaving only the inspection of unimportant licensees to rangers.

16. That the foresters make careful observations during the coming year on the influence of deforestation on the climate and waterflow, these observations to be embodied in their next annual report.

17. That the printed forms used by the bureau be amended in such a way as to lessen the paper work of the field force as much as possible.

18. That the Manila office take as much of the clerical work as possible from the district officers, especially in regard to circular letters.

19. That certain forest reserves be recommended as soon as data are at hand sufficient to limit their boundaries, and to justify the request for their reservation.

20. That an educational propaganda be inaugurated; first, through the schools; second, by means of stereopticon lectures; third, through the newspapers, and fourth, through general discussion.

21. That in order to arouse interest in Philippine forestry in the United States, frequent articles or reports be sent to the American forestry magazines for publication.

22. That a course of forestry be established in the new Philippine college of agriculture.

23. That a handbook of forestry for rangers be completed as soon as possible by the committee on publication.

24. That the annual conference of Philippine foresters be held each year in July, at which time, all foresters can be assured of having at least one month in the Manila office.

The following committees were appointed by the director of forestry: Administration—H. D. Everett, Wm. H. Kobbe, Wm. Klemme; Forest Investigation—H. N. Whitford, H. M. Curran, and M. L. Merritt; Publication—H. N. Whitford, H. D. Everett, Wm. Klemme.

H. D. EVERETT,
Recorder.

REDUCTION IN GOVERNMENT CHARGES ON TIMBER IN CERTAIN PROVINCES.

Act No. 1575, amending the forest act (January 1, 1907), provides but one scale of prices on government timber in all provinces. Formerly the government charges on timber in certain provinces were almost double that in others. The lower scale of prices was adopted. At present the government charges on timber ranges, approximately, from $1 to $5 U. S. currency per M B. M.

PHILIPPINE FOREST ACT DOES NOT APPLY TO UNITED STATES MILITARY RESERVATIONS.

The following letter was received during the month of November, 1906:

WAR DEPARTMENT,
BUREAU OF INSULAR AFFAIRS,
Washington, October 13, 1906.

SIR: With reference to letter from your office of the 7th of July, inclosing excerpt from the minutes of the Philippine Commission of July 3, 1906, which quotes an opinion of the attorney-general of the Philippines, that the Commission has no authority to extend the forestry laws over the United States reservations, and contains a resolution directing that the matter be submitted to the Secretary of War for final determination, I have the honor to state that upon the request of this department the Attorney-General of the United States has rendered an opinion in which he holds that the Philippine government can not extend its forestry laws to the military reservations in those islands. A copy of this opinion is herewith inclosed.

Very respectfully,

A. D. WILCOX,
Chief Clerk.
(In absence of Chief of Bureau.)

The honorable the GOVERNOR OF THE PHILIPPINES,
Manila, P. I.

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THE FREE-USE PRIVILEGE.

The free-use privilege has been the source of much complaint from the lumbermen and from forest officers. In many cases it is impossible to fix the blame for violating the forest act. The free-use men cut when, what, and where they please. Undersized trees of the first and other groups are taken; valuable trees felled and only a small part of them utilized; valuable forest tracts are being devastated in not a few but in many parts of the islands, and it is impossible, in the majority of cases, to fix the blame.

The residents of these islands should be allowed to take all the timber and other forest products they need for their own personal use free of charge and without license, but the bureau of forestry should be authorized to indicate to these people the forests where they can get these products, and the forests in which such free use is prohibited. The matter was referred to a committee of three foresters to submit a report which would include an amendment to act No. 1407, granting the free-use privilege.

The report submitted is as follows:

REPORT OF THE COMMITTEE ON FREE-USE PRIVILEGES.

It is the opinion of this committee that every home builder in the Philippine Islands should have a similar privilege to that granted settlers in the vicinity of national forests in the United States. There each settler is allowed an amount of timber each year not to exceed a fixed amount sufficient for his needs to be used by him in house building, repairs, fencing, etc. To obtain this timber he must apply to local forest officers and remove the material desired from such places and in such a manner as not to injure the public forests.

A similar right has been granted the Filipino people, but without the restrictions necessary to insure the safeguarding of public interests. The Filipinos may enter any public forest and cut such timber as they desire without restriction as to amount or sizes. Twelve of the more valuable woods, comprising what is known as the first group, are protected by the present law, but these, as a group, furnish less than one-sixth of the total cut of the islands, and the greater part of this one-sixth is from three to four species cut in the more inaccessible and thinly inhabited regions. In the thickly populated districts these twelve timbers have almost disappeared, and the bulk of the cut comes from lower group trees. It is from these species of the lower groups that the future supplies of the islands must be drawn. They are of more importance to the agricultural and commercial development of the islands than the first group timbers.

Rapid economic development depends on cheap construction timbers, and not on fancy woods, or expensive woods suited to special uses. Timber that will furnish the necessary construction timbers for Philippine industrial development is found in the existing forests, but is being rapidly destroyed by the present unrestricted cutting.

We are required to-day carefully to inspect and regulate the cutting of 1,000 timber licensees whose work is in the main satisfactory and is not materially injuring the forests, and we are forbidden to interfere with the cutting of a population of 7,000,000, of whom 1,500,000 are grown males. These men may enter the forests, cut and waste at will the principal timber resources of the islands.

The bureau of forestry was called into existence to perpetuate the forests by wise use, to give to the people of these islands timber and fuel supplies for all times, and to safeguard its agriculture by caring for watershed forests. Under the present law the hands of the bureau are tied, and the policy as embodied in this law, allowing the free and unrestricted use of timber, if persisted in, means the ultimate waste and destruction of the islands' timber resources and a checking of its future economic development.

In view of the shortcomings of the present law its amendment is suggested. This amendment should contain such part of the following rough draft as, in the opinion of the Philippine Commission, may best protect the public interests and aid in home building:

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AN ACT AMENDING SUBSECTIONS (*b*) AND (*c*) OF SECTION NINE OF ACT NUMBERED FOURTEEN HUNDRED AND SEVEN, SO AS TO PERMIT THE FREE USE OF FOREST PRODUCTS AND PROVIDING FOR THE REGULATION THEREOF.

By authority of the United States be it enacted by the Philippine Commission, that:

Section 1. Subsections (*b*) and (*c*) of section 9 of act 1407 be, and the same are hereby, amended so as to read as follows:

Sec. 9 (*b*). Every resident living in or near the public forests, and who is in need of building material, fuel, fencing, or other forest products, stone or earth, for the personal use of himself or his family, may, without written permit, enter such public forest as the director of forestry, with the approval of the secretary of the interior, shall designate, and may remove, free of charge, an amount of timber not to exceed fifteen cubic meters in any fiscal year, and such amount of other products as is actually necessary for his personal use. The director of forestry, with the approval of the secretary of the interior, shall prescribe species, sizes, and manner of removal of forest products, stone or earth, and may, if the public interests demand it, withhold from any individual the right, under this act, to the free use of timber in the public forests.

(*c*) The director of forestry, with the approval of the secretary of the interior, may, from time to time, set aside certain tracts of public land, which shall be known as communal forests, and be assigned to certain communities, whose free-use privilege shall be confined solely to these areas, subject to the limitations prescribed in subsection (*b*). These forests shall be on lands more suitable for forestry than for agriculture, and shall be administered by the director of forestry, with the approval of the secretary of the interior, under such rules and regulations as he may deem wise. The oject of the administration of these communal forests shall be to furnish the people having rights therein with the forest products necessary for their home use and to preserve their water supply. Exploitation of said communal forests for revenue shall be allowed only when the best interests of the forest demand a cutting in excess of local needs. Such exploitation for revenue shall be under license as in other public forests, and forest charges shall be collected in the usual manner and covered into the treasury of the Philippine Islands. These revenues to be returned to the community having rights in the given forest, and be devoted, under the direction of the secretary of the interior, acting with the advice of the superintendent of public instruction, to the public education of the community and the improvement and preservation of its forests.

Sec. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, ninteen hundred.

Sec. 3. This act shall take effect on its passage.

FIRST-GROUP TIMBER TO BE TAKEN WITHOUT CHARGE BY THE RESIDENTS OF THE PROVINCE OF CAGAYAN.

On January 8, 1907, a resolution was passed by the Philippine Commission granting authority to any resident of the province of Cagayan to take, free of government charge, under government license for one year, such certain timbers of the first group as he may require for house building, boat building, and other personal use of himself and family.

The forester in charge of this district reports that this privilege has been abused, that the rich residents only are taking advantage of it, and that much valuable undersized timber is being taken, contrary to law.

After this resolution was published six other provinces presented petitions for the free use of first-group timber, but they were not granted.

LARGE LUMBERING OPERATIONS ACTUAL AND POSSIBLE.

At least six large logging and lumber companies are needed in these islands to exploit forest tracts now available for operations. But one such—the Insular Lumber Company—is now operating on the Island of Negros. This company has a twenty-year exclusive privilege on a tract of 69 square miles and will shortly log and mill approximately 60,000 to 70,000 feet B. M. per day. Five or more such companies are needed in the islands to supply the local and foreign markets with timber at more reasonable prices than rule at the present time.

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Improved methods of forest exploitation by a few additional large companies would simplify the work of the present small force of forest officers. The thinly forested regions would then be used only as source of supply for the local demand, and the few remaining valuable timber trees in such localities could be protected and retained as centers of reproduction.

At the present time the Philippine market will consume approximately 100,000,000 feet of lumber per year. The amount of Oregon pine taken last year at Shanghai, China, was 85,000,000 feet; at Sydney, Australia, 65,000,000 feet. These three markets should take at least 300,000,000 feet per year of Philippine timber of a grade similar to or better than Oregon pine.

In the forest tracts now available there are large stands of timber close to tidewater. The haul is short, labor is cheap, and stumpage charges are low.

There are a few native woods found in large quantities that are suitable for the making of furniture. These woods should find a market in the United States as well as in the other markets mentioned.

Desirable tracts of public forests are now available and unoccupied in Mindoro, Bataan, Negroes Occidental, and Moro provinces. Maps of these districts have been made and estimates prepared, showing the stand, varieties of merchantable timber, possibilities of logging, etc.

The services of forest officers thoroughly acquainted with each tract will be placed at the disposition of prospective logging companies.

NORZAGARAY RIVER IMPROVEMENT.

Forest officers have reported from time to time that large stands of valuable timber were found on the upper waters of the Bayabas and Norzagaray rivers in Bulacan Province. This region is close to the Manila market, but the forests were not exploited to any extent on account of huge bowlders in the rivers mentioned, which obstructed the passage of rafts.

A forester of this bureau made an investigation and report. The matter was taken up with the governor of the province and with the bureau of public works.

The work of removing these obstructions was promptly inaugurated by the bureau of public works under authority of a resolution of the Philippine Commission. In a letter from the provincial governor, this office was informed that the obstructions have been removed.

This adds much to the available forest resources of the Province of Bulacan.

RAILWAY TIMBER.

Railway construction in the islands has proved a great stimulus to the timber industry. The railway officials are making an effort to secure native timber when possible. Act No. 1510 of the Philippine Commission gives the railway companies permission, with the approval of the Governor-General, to take timber, stone, and earth from the public lands. Act No. 1544 exempts all such material from internal-revenue taxes, provided the material is taken under license issued by this bureau.

The railway companies require a large amount of timber for general construction, as well as for ties, but find much difficulty in securing it from timber licensees. A glance at the page in the appendix to this report giving the list of amounts of timber taken under license last year by the 20 leading operators will indicate a reason for the difficulty.

The antiquated methods of logging in vogue in these islands by all but one operator will force the railway companies to look to foreign countries for their timber unless some of the timber licensees adopt modern methods.

Forest officers have endeavored to interest the licensees in furnishing material for the railways. Many licensees lacking experience in making ties have found that the proposition is not as lucrative as it at first appeared.

Forester Everett, who has charge of the forests of the Visayan Islands, where there is much activity in railway construction, makes the following statement as part of his annual report.

RAILROAD TIES.

"The cutting of railroad ties has been studied with considerable care by the forester and discussed in several monthly reports. Its importance deserves discussion in this report.

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"In October, 1906, the forester received copies of the proposition and specifications of the Philippine Railway Company for ties, with instructions from the director of forestry to interest timber licensees, as it was very desirable that Philippine timber be used as far as possible on the new railroads.

"After reading the proposition, the forester could only think that the Philippine Railway Company did not want to use native woods for ties and had issued a request for them for policy's sake only. Nevertheless, the forest officers of the district have devoted time and effort to stimulate the tie-cutting industry, and the bureau of forestry in general has done everything possible to assist the railway company in securing ties in the islands. Timber licenses have been granted without question to all who had made tie contracts.

"Contracts were made by many licensees in the district and cutting began with enthusiasm. After eight months I believe that tie cutting has almost stopped in this district. The contractors have found it a dangerous and losing business, for the following reasons. (1) The scarcity of the seven kinds of wood which alone are accepted; (2) the severe inspection of the ties by the railway company, and lack of a market for the rejected ties; (3) the low price offered for such valuable timbers in the form of ties.

"There is little doubt that the Philippine Islands can and should furnish the ties for the new railroads. Of what value is the boasted forest wealth of the islands if the railroad timbers are imported from the United States and Australia? The government should investigate the matter before permitting the importation of railroad timbers and discover conclusively why they can not be secured in the islands.

"The fault, in my opinion, does not lie in the restrictions of the bureau of forestry, nor in the nonproductiveness of our forests, nor in the inefficiency of our people, but in the proposition of the railway company. Given a suitable proposition and inspection, there will be little difficulty in the islands furnishing the necessary timber. The present proposition should be amended (1) in regard to price, (2) in regard to classes of timber, and (3) in regard to the inspection.

"1. *Price.*—There is paid ₱1.60 for ties made from molave, dungon, ipil, tindalo, yacal, acle, and betis, delivered on the right of way or in Iloilo and Cebu. It must be borne in mind that the Visayan roads will not pass through or very near any forests where such ties can be cut. Consequently the ties are cut in distant forest regions and transported at high cost to Iloilo and Cebu. There is offered ₱1.30 for ties placed in lots of 1,000 or more on board a boat of the company. I know of no contract made in this district under these terms, as the company prefers the ties delivered by the contractors, and few contractors can get 1,000 ties ahead in one place for evident reasons. In discussing the question of price, take a fair example. A licensee has put in all his available capital and six months of his time and has delivered 1,000 ties in Iloilo at the total cost to him of ₱1,000. Seven hundred ties are accepted at ₱1.60 each and 100 at ₱0.80. The remaining 200 are rejected, and he pays 15 cents government charges on them and is lucky to sell them for ₱0.50 each. He receives a total of ₱1,270. He sees that by six months' hard work, employing a capital of more than ₱1,000 and undergoing considerable risk, he has made ₱270 or ₱45 a month wages, with no interest on his capital, and he is fortunate to have done so well. Then he figures on molave logs. Molave brings ₱1 per Spanish cubic foot in the log. A log containing 12 cubic feet would not make more than four ties. For the log he would receive ₱12 in Iloilo, and if he worked it up into ties, he would get ₱6.40. Consequently many who began cutting ties have changed to cutting logs for the general market.

"2. *Classes of timber.*—Anyone familiar with the forests and timbers of the Philippine Islands recognizes the absurdity of accepting only seven classes of railroad ties. Not only are there other timbers suitable for railroad ties, but confining the list to those seven makes logging so difficult and costly that they can not be cut for the price offered. Further, it is doubtful if there is sufficient accessible timber of those kinds in the Visayas to furnish enough ties for the Panay, Negros, and Cebu railroads.

"3. *Inspection.*—The inspection of ties has not been sufficiently liberal, in view of the fact that tie cutting is a new industry in the Philippine Islands, but has been so strict as to discourage the contractors when a little more consideration and liberality would have done much to have kept them satisfied with terms otherwise so unsatisfactory. One licensee arrived in Iloilo with 650 ties, the result of five months' hard work on a wild coast. Four hundred and fifty were rejected because they were banuyo. Now, although banuyo is

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not included in the contract, its general reputation for durability is such that it would have been better to have accepted those 450 ties and kept a contractor than to have almost ruined him by rejecting them."

The purchasing agent for the Philippine Railway Company, upon receipt of the above extract, attended the foresters' conference and discussed the matter of securing railway material. It was recommended by the foresters that—

Additional woods be given a trial as ties.

A list of such woods was submitted, and the railway company agreed to test them if the foresters would cooperate in securing the desired number. The division of forest investigation will attend to this matter during the coming year.

CAIÑGINS.

Forest regulation No. 25, Paragraph A, authorized municipal presidents, in absence of a forest officer, to grant permits to make caiñgins (clearing by fire) on public lands. This office was advised from various sources that the municipal presidents were not careful in carrying out this regulation, and that much valuable timber was needlessly destroyed, as a result thereof.

The regulation was amended on December 6, 1906, by authority of the acting secretary of the interior. At present municipal presidents are authorized under the law (section 27 of the forest act) to grant caiñgin permits on private woodlands adjoining public forests.

There is no further necessity for granting caiñgin permits. The homestead law is very liberal and gives any resident of the Philippine Islands much latitude in selecting a location.

The only persons authorized to grant caiñgins on public lands (forest officers) will assist any resident in securing a homestead rather than granting a caiñgin permit. In the records of this office there is a list of persons granted caiñgin permits and homesteads during the past two years. This list is so indexed that a check may be readily kept on persons making caiñgins each year or two.

These devastators of the forest will travel for many miles from their barrios to the edge of the forest and begin operations by ringing the tall trees, and later fell and burn them. The ask makes a good fertilizer, and as the soil is loose and plowing with a stick is all they deem necessary a small amount of rice is planted and a very small crop is raised.

In a year or two the tall cogon grass begins to appear, and forces the man who will not even attempt to plow it out to move once more into the heavy timber and repeat the former operation.

The maps now on file in this office show in color a vast area of such land.

Should a person desire to purchase public land in a region where caiñgins had been made he would be informed that a large part of such devastated land was private property and claimed by the persons above mentioned, although no taxes or other claim had ever before been made by them.

REGISTRATION OF PRIVATE WOODLANDS.

During the fiscal year titles to 20 private woodlands were registered in the bureau of forestry in accordance with section 24 of the forest act. The total area of the estates registered is 135,880.42 hectares, of which 68,222 represent the approximate area of woodland. Thirteen of the estates registered during this period are part of the estates belonging to what is known as the Friar lands, recently purchased by the Philippine government.

Up to the present time 169 estates with more or less woodland, and comprising a total area of 283,693 hectares, or approximately 700,000 acres, have been registered in this office.

FOREST MAPS.

The 10 forest districts of the archipelago are divided into plots of 10 kilometers square and each square given a number. Forest officers use as points of reference the places in the district that have been fixed by the coast and geodetic survey.

Each forester while traveling in his district makes constant use of a topographical notebook, compass, and barometer, and a reconnoissance sketch is made on each 10 by 10 kilometer sheet as he passes from square to square. At this time the limits of the forests are noted, as are also those of the cultivated and uncultivated lands, condition of roads, trails, streams, etc. The original

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sheets thus plotted are sent to the Manila office. Copies are retained by each forester. The Filipino forest officers are being trained in this class of work and are making satisfactory progress.

More detailed surveys are made of special forest tracts by an assistant forester who is a competent topographical engineer. On these tracts careful forest studies are made by a field force consisting of one or more foresters, the rangers of the locality, and the necessary laborers.

These reports are prepared for the special use of prospective logging companies.

DIVISION OF FOREST PRODUCTS.

On July 25, 1906, the division of forest products was established. The object of the division is to investigate the amount, character, value, and uses of the Philippine forest products, and to bring this information to the notice of Philippine and foreign markets. As the records for the past years showed considerable partially classified information it was necessary to collect and systematize the same, and to prepare such part of it as was deemed advisable for publication. In accordance with this, the work of the division has been concentrated along the following lines:

I. Preparation for the printer of data collected for publication.
II. Classification and cataloguing of reports on hand.
III. Collection of museum samples of forest products.
IV. Durability tests.
V. Forest investigation.

I. Preparation for the printer of data collected for publication.

The following, issued in December, 1906, were prepared for publication:

Bulletin No. 4. I. Mechanical Tests, Properties, and Uses of Thirty Philippine Woods. II. Philippine Sawmills, Lumber Market, and Prices, by Rolland Gardner, Manager of the Timber Testing Laboratory.

Bulletin No. 5. Preliminary Working Plan for the Public Forest Tract of the Insular Lumber Company, Negros Occidental, P. I., by Foresters Everett and Whitford.

Bulletin No. 6. Preliminary Working Plan for the Public Forest Tract of the Mindoro Lumber and Logging Company, Bongabon, Mindoro, P. I., by Foresters Merritt and Whitford.

Circular No. 1. Opportunities for Lumbering in the Philippine Islands.

The following bulletin will be ready for publication in the near future: Preliminary Check List of the Principal Timber Trees in the Philippine Islands.

The following bulletins are in process of completion: The First Ten Timber Trees of the Philippine Islands; Some Philippine Forest Types and Their Commercial Possibilities; A Ranger's Primer of Forestry.

A second edition of Bulletin No. 4 has been prepared and sent to the director of printing.

II. Classification and cataloguing of reports on hand.

The classification and cataloguing of reports collected during the five years' existence of the bureau up to July 1, 1906, meant the personal inspection by the chief of the division of forest products of all information collected covering the subject of forest products up to that date. This information is filed and indexed.

III. Collection of museum samples of forest products.

LOG SPECIMENS.

With few exceptions, each wood specimen now in the museum consists of what can be designated as log specimens, with one or more hand specimens. The log specimens are divided into three sizes:

(*a*) Large specimens 3 feet in height and from 10 to 25 inches in diameter, cut to show bark and cross, radial, and bevel sections.

(*b*) Medium specimens 2 feet 4 inches in height and 6 to 12 inches in diameter, cut as above.

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(c) Small specimens 9 to 18 inches in height, cut as above, or smaller ones cut in various sizes.

These specimens are to be arranged: First, according to sizes, those of each size according to group, and within the group according to scientific names. The arrangement by scientific names is preferable to the use of common names, because specimens of more than one common name would otherwise become separated. All specimens have labels giving information concerning their origin, herbarium, number, uses, value, and quantity available.

The object of the wood collection is to obtain eventually authentic specimens of all the timber trees of the islands, and to make them as useful as possible to those interested in the wood and lumber industries of the islands. The following is the present status of the wood collection: Total number of samples on hand, 3,235; total number of species represented, 336.

BEJUCOS.

The arrangement and numbering of the specimens of bejuco have been little disturbed. Catalogue cards have been made out containing such information as has been gathered concerning them. These cards have been inserted in the general catalogue and may be found under the common names of the bejuco desired.

Within the past year a number of commercial bejucos have been collected in fruit. As soon as the collection is sufficiently large, it will serve as a basis for structural study, the results of which will make it possible to classify more satisfactorily the commercial collection.

Bejucos with botanical specimens are given the regular herbarium number.

Bejuco buyers for the American market have examined the large line of specimens in the museum. Preferred species have been noted. Prices quoted have been added to other information on the label. There are a number of desirable furniture bejucos in the islands, and an endeavor will be made to find a market for them. At present the principal use of Philippine bejuco is for baling purposes.

OTHER MINOR FOREST PRODUCTS.

The minor forest products other than bejucos had already been given serial numbers, beginning with one. These numbers were retained. The whole collection was arranged in uniform boxes of three sizes. The exhibit was then arranged in groups under the following heads: Almaciga, Brea, Rubber (including gutta-percha), and Miscellaneous.

Each specimen has the number pasted on it, a display card, and a catalogue card. The latter may be found in the general index. Minor forest products, with botanical material, are given herbarium numbers.

IV. Durability tests.

With the issuance of Circular No. 7, dated October 24, 1906, there was inaugurated a system of labeling timber used in certain classes of construction. Arrangements have also been made with the bureau of public works, the bureau of posts, and the railway companies, to aid in this work. The object of these tests is to obtain more accurate information concerning the durability of Philippine timbers. Reports of tests with wood samples are given a special file.

V. Forest investigation.

During the fiscal year the following papers have been prepared that add materially to our knowledge concerning the Philippine forests and their products:

I. Report on examination of pine lands, Province of Benguet, Forester H. M. Curran. (See p. 155.)

II. A preliminary examination of the forests of the Kabibihan River basin, province of Tayabas, P. I., with map.[a] Forester William H. Kobbe.

III. Report on forest conditions in the mining region of Aroroy, Masbate, P. I., with map.[a] Foresters F. L. Pray and H. M. Whitford.

IV. An available forest tract in Negros Occidental, with map.[b] Forester H. D. Everett. (See p. 153.)

V. Report on the forests of Danao, Cebu, and timbers used by the Insular Lumber Company, with map.[a] Forester H. D. Everett.

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[a] Not received in the War Department for printing.

[b] This map has not been received in the War Department.

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VI. A progress report on the investigation of Philippine timbers. R. Gardner.[a] (Included in second edition of Bulletin 4.)

VII. An available forest tract in northeastern Mindoro, with map.[a] Forester M. L. Merritt. (See p. 154.)

The work of this division has been so satisfactory and its scope has so broadened that it has been decided to change its title to "Division of forest investigation."

TIMBER-TESTING LABORATORY.

The manager of the timber-testing laboratory resigned in February, having completed three years' service. He accepted a position with the Philippine Railway Company, receiving a substantial increase in salary.

During the year, 11 native timbers and 4 Japanese woods received a series of tests.

A large number of log and other smaller wood specimens were prepared in the laboratory for the museum of this bureau.

On December 4, the manager of the timber-testing laboratory was, at the request of the secretary of public instruction, sent to Bacolod, Iloilo, Dumaguete, Tagbilaran, and Lucena for the purpose of inspecting the timber being used in the construction of schoolhouses at those places. There was a dispute as to the classes of wood used in construction. The contractors offered to pay all expenses if this office would send a wood expert to make an examination and report. The examination and report showed that in certain places inferior woods not called for in the specifications and inferior grades of the woods called for were being used.

CEYLON RUBBER EXHIBITION.

A representative of the bureau was sent to attend the Ceylon Rubber Exhibition, held at Peradeniya, Ceylon, September 13–27, 1906. Specimens of Philippine rubber and gutta-percha and copies of all information with reference to this industry in the Philippine Islands were taken as exhibits. In his report he states: "The Philippine exhibit, which was distinctly different from any other shown, attracted considerable attention and favorable comment."

Valuable information was secured with reference to the best methods of planting rubber, when and how to tap rubber trees, the preparation of the rubber for commercial use, etc.

He also purchased for the museum of this bureau a set of the instruments used by rubber planters, samples of the best grade of rubber, and a set of interesting photographs, showing the various stages of the rubber industry.

ZAMBOANGA FAIR.

An exhibit of wood samples and minor forest products common to Moro Province was prepared and exhibited at the Zamboanga fair, held in Zamboanga, February 12–15, 1907.

EXHIBIT OF FOREST PRODUCTS SENT TO THE UNITED STATES.

An exhibit of 40 large wood samples, a set of minor forest products, and several sets of publications of the bureau were prepared and shipped to the Pacific Commercial Museum at San Francisco, Cal.

GEORGE P. AHERN,
Director of Forestry.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

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[a] Not received in the War Department for printing.

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APPENDIX.

LIST OF LICENSES, JULY 1, 1906, TO JUNE 30, 1907.

Province.	Timber.		Firewood.		Gratuitous.		Minor products.		Total.
	By bureau.	By subordinates.	By bureau.	By subordinates.	By bureau.	By subordinates.	By bureau.	By subordinates.	
Laguna	24		6	7			3	4	44
Rizal	15	1	10	22			3	5	56
Cavite	3		3	13				1	20
Bataan	49		5	31	2		2	17	106
Pampanga	13		1	5	2				21
Bulacan	20	2	1	3	2		4	10	42
Zambales	36		6	17	6		11	45	121
Tarlac	27	2	3	18	10			3	63
Pangasinan	42	26	1	31	2			15	117
Benguet	6	7	1		2		1		17
Nueva Ecija	31	12		8	3			13	67
Nueva Vizcaya	2	12			4	1			19
Ilocos Norte	13	38			3				54
Ilocos Sur	20	29		22	1		2	5	79
Lepanto-Bontoc	15	21			7				43
Union	10	7			1				18
Cagayan	36	3		9	1	38	1	23	111
Isabela	17				6			1	24
Tayabas	41	27		65	1			87	221
Camarines	25	3		32	3		1	54	118
Mindoro	44	7	1	43	1		3	50	149
Batangas	3			7					10
Romblon	11			3				8	22
Iloilo	13	4		33				24	74
Capiz	4	1	2	15				1	23
Antique	1							1	2
Negros Occidental	35	1		51	2			42	131
Negros Oriental	11	13		6	2			10	42
Cebu	10	5		3				5	23
Bohol	8			7					15
Leyte	13			12	1			7	33
Samar	3			5			1	4	13
Albay	20	2	4	5			5	4	40
Sorsogon	47	2	23	31	7		13	47	170
Moro	42	10		21	4		2	52	131
Misamis	6	1		1				3	11
Surigao	20			1	2		1	1	25
Palawan	24	1		8			1	14	48
Total	760	237	67	535	75	39	54	556	2,323

TIMBER LICENSES GRANTED IN FORMER FISCAL YEARS.

Year.	By bureau.	By subordinates.
1906	1,053	216
1905	1,177	494
1904	1,027	304
1903	988	
1902	672	

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REPORT OF THE UTILIZATION OF FOREST PRODUCTS FROM PUBLIC LANDS ON WHICH GOVERNMENT CHARGES HAVE BEEN COLLECTED FROM JULY 1, 1906, TO JUNE 30, 1907.

[Qq. m.=One metric quintal, or 220.46 pounds.]

Province.	Timber.			Minor products.						
	First group.	Lower groups.	Total.	Fire-wood.	Char-coal.	Tan-bark.	Dye bark.	Wood oils.	Rattan.	Gum mastic.
	Cu. m.	*Cu. m.*	*Cu. m.*	*Cu. m.*	*Cu. m.*	*Qq. m.*	*Qq. m.*	*Liters.*	*Pieces.*	*Qq. m.*
Albay	115	680	795	880					1,170,900	100
Ambos Camarines	212	2,027	2,239	5,351					11,692,074	308
Antique				146		9	40		39,000	
Bataan	21	12,539	12,560	32,241	899				3,732,417	
Batangas	23	19	42	955					137,890	
Benguet		995	995	3						
Bohol	142	511	653	194				12	38,000	
Bulacan	50	3,249	3,299	10,560	320	25			1,017,200	8
Cagayan	1,508	543	2,051	670		225			4,537,800	1
Capiz		44	44	7,844		83	117	612		
Cavite	2	174	176	3,187	88					
Cebu	100	392	492	2,632	390	113		1,098	529,550	
Ilocos Norte	113	45	158	317					6,480	
Ilocos Sur	258	749	1,007	8,695					177,350	
Iloilo	172	53	225	15,084	405	6			64,800	
Isabela	565	375	940	30					856	
Laguna	8	1,360	1,368	1,665					606,300	
Lepanto-Bontoc	10	6	16							
Leyte	156	1,059	1,215	5,158		497		1,123	2,676,380	
Mindoro	1,459	7,151	8,610	4,902	5	2,902	409		836,080	
Misamis	10	26	36	117					378,412	
Moro	608	1,964	2,572	3,209		2,622	1,033		1,685,500	4,334
Negros Occidental	123	5,955	6,078	7,446		676		4,811	2,605,500	16
Negros Oriental	94	20	114	6,454		69		5,283	1,776,100	2
Nueva Ecija	256	228	484	60		226			867,482	
Nueva Vizcaya	7		7							
Palawan	3,096	55	3,151	274		127			471,800	811
Pampanga	4	795	799	12,909	146					
Pangasinan	452	952	1,404	5,096	245	154	10		402,700	
Rizal	6	61	67	16,351					2,085,520	
Romblon	6	517	523			3				98
Samar	33	42	75	441		57		2	48,000	
Sorsogon	1,440	1,381	2,821	4,528	1	1,214	6		9,409,050	4
Surigao	84	79	163	437		70			284,150	
Tarlac	101	1,027	1,128	3,121	19	31			61,858	
Tayabas	2,928	4,856	7,784	14,429		219	287		1,029,740	543
Union	83	100	183							
Zambales	90	3,191	3,281	1,173	833				1,615,880	
Total	14,335	53,220	67,555	176,559	3,351	9,328	1,902	12,941	50,078,719	6,225

Gutta-percha and rubber	qq. m.	942
Dyewood, Province of Iloilo	qq. m.	33,841
Pitch	qq. m.	404
Gogo	qq. m.	181
Diliman (vine for fishtraps)	pieces	125,160
Stone	pieces	642
Stone	cavans	318
Earth	ollas	55

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AMOUNT OF TIMBER TAKEN OUT BY LEADING LICENSEES DURING THE FISCAL YEAR 1906–7.

Licensee.	Location.	Amount cut.
		Cubic meters.
Insular Lumber Co.[a]	Cadiz Nuevo and Sagay, Negros Occidental	2,619
Mindoro Lumber and Logging Co.[a]	Pinamalayan, Mindoro	1,194
Reiss & Mitchell [a]	Pasacao, Camarines	443
Timber Cutters' Association of Unisan.	Pitogo, Tayabas	1,255
John Gibson	Pinamalayan, Mindoro	1,181
Vicente Mijares	Dinalupijan	1,030
José Verchez	Calauag, Tayabas	924
Felix Labasan	Subic, Zambales	797
Chas. A. Barber	Pinamalayan, Mindoro	768
Beebe, Lyon & Co	Zamboanga, Moro	761
Nicanor Afable	Subic, Zambales	695
Faustino Lichauco	Orion, Bataan	682
Compañia Maderera de Luzon	Guinayangan, Tayabas	642
Gelacio Linas	Moron, Bataan	632
Ang Katiagaan	do	609
Ramon Murga	Puerto Princesa, Palawan	604
Astigarraga & Co	Camalaniugan, Cagayan	599
Juan Duran	Moron, Bataan	567
Marcelo Gutierrez	Bagac, Bataan	559
Paulo Gustilo	Manapla, Negros Occidental	544
Total	Cubic meters	17,103
	Board feet	5,130,900

[a] Twenty-year license agreement.

NOTE.—Five hundred cubic meters of Philippine timber as furnished the mills will approximate 150,000 feet B. M.

Only 5 other licensees have cut over 500 cubic meters. Timber licenses to the number of 997 were issued during the fiscal year.

IMPORTS OF LUMBER INTO THE PHILIPPINE ISLANDS DURING THE FISCAL YEAR 1906–7.

From—		Quantity.	Value, United States currency.
United States	M feet, B. M.	10,734	$163,836
Other countries	do	2,574	119,843

In addition 3,008 M feet B. M. of Oregon pine, free of duty, were imported by the quartermaster department, United States Army.

EXPORTS OF LUMBER FROM THE PHILIPPINE ISLANDS DURING THE FISCAL YEAR 1906–7.

To—		Quantity.	Value, United States currency.
United States	M feet, B. M.	181	$3,630
Other countries	do	71	1,406

Sappan wood (dyewood) to the value of $51,695 United States currency were exported.

Cabinet ware and house furniture were exported to the United States to the value of $910 United States currency, and to other countries to the value of $1,908 United States currency.

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APPLICATIONS FOR PERMITS TO MAKE CAIÑGINS, JULY 1, 1906, TO JUNE 30, 1907.

Province.	On public lands.			On private lands.		
	Granted.			Granted.		
	By forest officers.	By municipal presidents.	Total.	By forest officers.	By municipal presidents.	Total.
Albay	45	1	46			
Ambos Camarines	50	158	208	2	6	8
Antique	50		50	1	8	9
Bataan	175		175			
Bulacan	3		3			
Capiz	6		6		6	6
Ilocos Norte	7		7			
Ilocos Sur	161	124	285		1	1
Iloilo	8		8	1	1	2
Lepanto-Bontoc	31		31			
Leyte	15	1	16			
Mindoro	69		69	148	92	240
Moro	62	1	63	4	15	19
Negros Occidental	126	1	127			
Nueva Ecija	3	6	9	3	2	5
Palawan	20		20			
Pampanga	3		3			
Pangasinan						
Romblon	32		32	2		2
Sorsogon	12		12		17	17
Surigao	1		1			
Tayabas	175	7	182	46		46
Union		4	4		5	5
Zambales	3		3			
Total	1,057	303	1,350	207	153	360
Total 1905-6	657	464	1,121	121	71	192

APPLICATIONS FOR HOMESTEAD, PURCHASE, AND LEASE OF PUBLIC LANDS, JULY 1, 1906, TO JUNE 30, 1907.

[Certified as more valuable for agriculture or forest purposes.]

Province.	Homestead.			Purchase.			Grand total.
	Agriculture.	Forest.	Total.	Agriculture.	Forest.	Total.	
Albay	6		6				6
Ambos Camarines	30		30				30
Antique	1	1	2				2
Bataan	18		18	4		4	22
Cagayan	10		10	1		1	11
Ilocos Norte	18		18				18
Ilocos Sur	15	1	16	3		3	19
Iloilo	19		19				19
Isabela	31	2	33	2		2	35
Laguna	2		2				2
Leyte	9		9				9
Mindoro	84	2	86	1		1	87
Moro				1		1	1
Negros Occidental	102	9	111				111
Negros Oriental	7	1	8	1		1	9
Nueva Ecija	160		160	1		1	161
Pampanga	9		9				9
Pangasinan	17		17				17
Rizal	10		10				10
Romblon	48		48				48
Sorsogon	41		41				41
Surigao	3		3				3
Tarlac	35		35	1		1	36
Tayabas	189	3	192	8		8	200
Union	4		4				4
Zambales	13		13				13
Total	881	19	900	23		23	923
During fiscal year 1905-6	318	16	334	20	1	21	355
Total, two fiscal years	1,199	35	1,234	43	1	44	1,278

Bataan, Palawan, Tayabas — 1 lease each applied for; Moro, 9 leases applied for — Certified as more valuable for agriculture.

NOTE.—On June 30, 1907, there were 1,427 homestead, 22 sale, and 2 lease applications, pending report by forest officers.

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REVENUE FROM THE SALE OF FOREST PRODUCTS.

Province.	Amount.	Province.	Amount.
Albay	₱1,542.40	Mindoro	₱2,681.29
Ambos Camarines	6,475.68	Misamis	1,192.63
Antique	39.78	Moro	14,811.74
Bataan	4,152.56	Negros Occidental	4,218.65
Batangas	605.63	Negros Oriental	676.32
Benguet	942.55	Nueva Ecija	1,590.15
Bohol	431.15	Palawan	1,653.28
Bulacan	7,475.43	Pampanga	2,589.28
Cagayan	4,752.33	Pangasinan	5,703.70
Capiz	1,340.46	Rizal	2,252.43
Cavite	520.50	Romblon	217.49
Cebu	7,177.52	Samar	559.14
Ilocos Norte	1,528.46	Sorsogon	4,414.84
Ilocos Sur	3,428.27	Surigao	431.85
Iloilo	14,766.64	Tarlac	2,634.41
Isabela	2,344.29	Tayabas	6,871.72
Laguna	1,489.34	Union	1,067.91
Lepanto-Bontoc	84.50	Zambales	724.72
Leyte	4,516.78		
Manila	73,174.67	Total	191,080.49

EXPENDITURES BY THE BUREAU OF FORESTRY, JULY 1, 1906, TO JUNE 30, 1907.

FIELD FORCE.

Salaries and wages, forest officers	₱58,987.66
Salaries and wages, map section	2,240.00
Labor hire and field parties	2,244.37
Per diems and traveling expenses	14,244.89
Postage and telegrams	386.74
Transportation and freight	1,368.01
Supplies	983.18
Office rents	434.00
Commuted leaves	3,934.00
Total	84,822.85

CLERICAL FORCE.

Salaries and wages	₱10,651.83
Postage and telegrams	547.00
Labor hire	12.00
Transportation	223.46
Office supplies	370.14
Commuted leaves	3,389.66
Total	15,194.09

TIMBER-TESTING LABORATORY.

Salaries and wages (one assistant engineer)	₱1,718.89
Supplies	210.46
Wood samples	516.19
Commuted leave	825.10
Total	3,270.64

OTHER EXPENSES.

Printing and binding	₱2,752.34
Repairs and miscellaneous expenses	964.44
Refunds	1,651.28
Total	5,368.06

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RECAPITULATION.

Expenses, field force	₱84,822.85
Expenses, clerical force	15,194.09
Expenses, timber-testing laboratory	3,270.64
Miscellaneous	5,368.06
Total	108,655.64
The above includes expenditures for outstanding obligations pertaining to the fiscal year 1906, amounting to	3,606.09
Appropriation for 1907	100,000.00
Additional appropriation	5,000.00
Balance from fiscal year 1906	6,853.90
Total	111,853.90
Outstanding obligations fiscal year 1906, of which ₱1,353.50 reported as expenditures in last annual report, but actually paid during fiscal year 1907	4,969.59
Available for fiscal year 1907	106,884.31
Balance on hand June 30, 1907	1,834.76
Expenditures, fiscal year 1907	105,049.55

AN AVAILABLE FOREST TRACT IN OCCIDENTAL NEGROS.

[By H. D. EVERETT, Forester.]

There is in northern Negros a large tract of forest very suitable for a lumbering operation on a large scale. In respect to purity of stand and heaviness of yield, factors of great importance in a large operation, it is probable that this forest is not excelled in the Philippines. In almost all respects it is similar to the tract of the Insular Lumber Company, for which a working plan was made in 1906. For a detailed description of that tract see Bulletin No. 5, bureau of forestry, Manila, P. I., A Preliminary Working Plan for the Public Forest Tract of the Insular Lumber Company, Negros Occidental, P. I.

The tract adjoins that on which the Insular Lumber Company is now operating, and extends from the Talabon River, in Cadiz, through the municipalities of Manapla, Victorias, Saravia, and Silay, gradually moving farther back from the coast up the slopes of Mount Silay or Maripara (see map).[a] The more accessible part, and that which would be suitable for present lumbering, is in the towns of Cadiz, Manapla, and Victorias.

The topography, as shown by the map, is characterized by low, broad ridges in the lower edge of the forest, which gradually become sharper and higher and separated by deep canyons as the mountain is ascended. The soil is a deep brownish yellowish clay, fairly suitable for agriculture.

The forest is characterized by a numerous dominant stand of six large trees, belonging to the family *Dipterocarpaceæ*, which are merchantable species. They are balacbacan (*Shorea polysperma* Merr), red lauan (*Shorea* sp.), apitong (*Dipterocarpus grandiflorus* Blanco), almon (*Shorea squamata* Dyer), lauan dunlog (*Shorea contorta* Vid), and lauan bagtican (*Shorea* sp.). The wood of the first two is red and very similar, and that of the last three is commonly called white lauan. Beneath these large trees is an understory of many smaller species, some of which may become merchantable.

Of this forest there are 25 square miles available lying below 750 feet above the sea. This timber is accessible and can be logged profitably at the present time. In addition there are 15 square miles above 750 feet which can be logged later.

The accessible 25 square miles, or 160,000 acres, have an average of at least 30,000 feet B. M. of merchantable timber per acre, or a total supply of 480,000,000 feet B. M. This would supply a sawmill, cutting an average of 50,000 feet B. M. per day, for three hundred days each year for thirty-two years.

[a] Not received in the War Department.

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The most important factor affecting the exploitation of this forest is the transportation of the lumber to the market. The tract differs from that of the Insular Lumber Company in that it has no good navigable river which steamers and barges can readily enter. The Sicaba River, which is navigable nearly to the barrio of Caduhuan, has such a bad bar that its use as a harbor is practically out of the question.

The best and cheapest method of exploitation is clearly by means of railroads. The new railroad which the Philippine Railway Company has contracted to build in Negros as planned will pass approximately through the barrio of Caduhuan, parallel with the edge of the forest and a little more than 2 miles distant. A lumber company would find it advisable to build its sawmill on the Sicaba River, where the railroad crosses it, and build its own logging railroad into the forest. The sawed lumber could then be shipped to the Danao River, the northern terminus of the railroad, a distance of about 25 miles, or to Silay. Such an operation will require a large capital, but managed efficiently should prove profitable.

So similar are this tract and the adjoining one on which the Insular Lumber Company are now operating that the following extract, from Circular No. 1, bureau of forestry, applies equally to both, and gives a clear idea of the lumbering possibilities in this region:

"SUMMARY OF LUMBERING POSSIBILITIES ON ONE TRACT OF PUBLIC FOREST IN NEGROS OCCIDENTAL.

"In Bulletin No. 5 of the bureau of forestry a description is given of the forests and lumbering operations near Cadiz, Negros Occidental. The summary of this bulletin is as follows:

"Area of tract, 69 square miles; area in forest, 37,668 acres.

"Stumpage charges on this tract are collected on manufactured lumber and average less than $1.20 United States currency per thousand feet B. M.

"Six tree species constitute about 90 per cent of the total stand of merchantable timber on the entire tract.

"AMOUNT AND VALUE OF MERCHANTABLE TIMBER ON TRACT OVER 20 INCHES IN DIAMETER.

Species.	Stumpage charge, M feet B.M. (approximate).	Feet B. M. per acre.	Total yield, M feet B. M.	Manila price, M feet B. M.	Value per acre.	Total value.
Apitong	₱4	5,140	193,572	₱90–₱115	460	₱17,421,480
Almon	2	7,150	269,269	70– 90	500	18,848,830
Balacbacan	4	4,640	174,742	70– 90	325	12,231,940
Mangachapuy (Red Lauan)	2	13,240	498,618	70– 90	925	34,903,260
Lauan-bagtican and Lauan-dunlog	2	1,880	70,801	70– 90	130	4,956,070
Total		32,050	1,207,002		2,340	88,361,580

"₱2 equals $1 United States currency."

AN AVAILABLE FOREST TRACT IN NORTHEASTERN MINDORO.

[By Forester M. L. MERRITT.]

During the year a special study was made of the forests of northeastern Mindoro by the district forester. The area studied has a coast line of about 65 miles, and extends back 7 to 18 miles from the beach.

With the exception of a strip 2 to 5 miles wide along the coast the whole area is solidly wooded. While some of the forest is not of the best quality, several excellent stands occur. The best stand, 40 square miles in extent, lies southwest of Lake Naujan. This lake is a body of fresh water about 9 miles long and 5 miles wide, deep, and navigable throughout, with the exception of the western side, which is shallow and low near the beach. It is connected with the sea by a river 9 miles in length. This river is deep and navigable for its upper half throughout the year and for its lower half during the rainy and a portion of the dry seasons.

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In this region rapid tree counts were made on more than 100 acres along representative strips 10 meters wide. An average of about 38 trees over 1 foot in diameter were found per acre. Of these trees 47½ per cent in numbers are of 4 species of *Dipterocarpus:* Alam (*Shorea squamata*), 27.7 per cent; lauan (*Shorea contorta*), 9.7 per cent; tanguile (*Shorea* sp.), 6.9 per cent, and apitong (*Dipterocarpus* sp.), 3.2 per cent. Of the trees over 2 feet in diameter more than 70 per cent are of these 4 species. This will yield, after making an allowance of 25 per cent for defects, about 20,000 feet B. M. per acre. In making this estimate account is taken only of trees over 60 centimeters (2 feet) in diameter of the 4 above-mentioned species. The entire area of 40 square miles of this forest, according to this estimate, contains 512,000,000 feet B. M.

In addition to this yield there are scattering trees of a few other commercial species.

The country thus forested is made up of clay hills rising from the lake shore to an elevation of about 800 feet at a distance of 4 miles inland. Ridges, slightly broken in a few places, run back into this area and afford direct access to about half of this timber. Some difficulty would be found in reaching the rest, owing to the cuts and gullies in the soft clay hills, but in few, if in any, places will this preclude logging operations.

In addition to this area southwest of the lake, fair forests border the east and north sides, which would furnish malugay (*Pometia pinnata*), narra (*Pterocarpus indicus*), and other merchantable trees.

Logs may be rafted across the lake and down the river to the sea, which is within fourteen hours by steamer from Manila. Or, should it be desirable to avoid rafting over the lower half of this river, which is shallow during the dry season, and if it is also desired to avoid the danger and uncertainty of loading upon an open beach, a logging railroad could be constructed without much cost to the pier at Calapan, distant about 13 miles, where loading would be comparatively easy.

The following table shows prices and commercial names of timber tributary to Lake Naujan.

Commercial name.		Price.
Almon (Alam)	M B. M.	₱70 to ₱90
White Lauan	do	70 to 90
Tanguile or Balacbacan	do	95 to 120
Apitong	do	85 to 100
Malugay	do	95 to 130
Narra	do	225 to 300
Baticulin	do	200 to 250
Amuguis	do	110 to 150

In addition to this excellent forest, which has remained almost untouched because of its distance from market, a stand of at least 14,000 feet B. M. per acre is found, covering about 25 square miles in the vicinity of Balete, farther down the coast to the east and close to the forest above mentioned.

REPORT OF AN EXAMINATION OF PINE LANDS, TRIBUTARY TO BAGUIO, PROVINCE OF BENGUET.

[By H. M. CURRAN, Forester.]

The object of this examination was to determine the amount of timber near Baguio; to locate bodies of timber suitable for commercial exploitation; to make a detailed examination of one such tract, and to outline a plan for the protection of the region from forest fires. As a result of this examination sketch maps of Baguio and vicinity have been prepared, showing roughly the forest, cultivated, and grass areas.

Four tracts of commercial forests were located, covering a total area of 3,556 acres.

The principal tree of this region is pine (P. insularis), and occurs in practically pure stands. This pine closely resembles western yellow pine (P. ponderosa). The region occupied by this tree is broken and hilly, and the prominent features of its topography are long, narrow, connecting ridges, with many short lateral spurs. The crests of the ridges are 200 to 500 feet above the water courses. The slopes are steep, and those of 30 to 40 degrees are not uncommon.

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The whole region has been constantly swept by grass fires, and the resulting stand is thin and open. The trees are short boled and knotty, excepting where small patches have been protected from fire by the topography. Here the trees are often straight, clear boled, with gradually tapering stems and small crowns. Coarse grasses and ferns cover the ground over the greater part of the area. Patches of reproduction are found where fires have been less frequent and severe.

The trees apparently bear large crops of fertile seed each year, and but for the fires an excellent reproduction, like that of loblolly pine (P. taeda), would be present over the whole area. The tree is a rapid grower, nodes 1 to 2 feet long are noted, and the rings of growth are often very wide. Merchantable timber can probably be grown in thirty to forty years from seed. A sample tree in a dense, even-aged stand on a favorable site had a diameter of 14 inches at breast height and showed 40 periods of growth. Its clear length was 60 feet. The live crown began at 74 feet and the total height of the tree was 108 feet.

A detailed examination of 963 acres of commercial forest was made. All the trees on 70 acres were measured and taper analyses made of 20 felled trees. The result of these measurements is as follows:

Average number of trees per acre over 10 inches diameter breast high		13
Average diameter	inches	21
Average board contents, 21-inch tree	feet	550
Average stand per acre	do	7,150
Approximately 32 per cent of the stand was marked for cutting, giving an average cut per acre of, approximately	feet	2,300
On this basis, the cut for the 963 acres of forest examined would be	feet	2,224,900
And for the entire region of 3,556 acres	do	8,178,800

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APPENDIX D.

REPORT OF THE DIRECTOR, BUREAU OF SCIENCE.

DEPARTMENT OF THE INTERIOR,
BUREAU OF SCIENCE,
Manila, P. I., August 5, 1907.

SIR: The following report gives an account of the work performed in the bureau of science for the period from August 1, 1906, to August 1, 1907, together with such recommendations as to future improvements as seemed to me to be necessary.

THE ETHNOLOGICAL MUSEUM.

The ethnological survey, which was formerly a bureau and was transferred as a division to the bureau of education on November 1, 1905, was placed in charge of this bureau one year thereafter. This division up to the present time has been confined to temporary and inadequate quarters; first in the district of Malate, subsequently in the general government building on Plaza Binondo, afterwards in the bureau of education. It has never had a place for the proper care and display of its materials, and therefore deterioration, breakage, and loss was the inevitable result. During the present year, sufficient funds have been available in the appropriation for this bureau to alter and repair the quarters formerly occupied by the bureau of architecture and to place them in a fit condition to receive the ethnological museum. The transfer of this building of this bureau was brought about after considerable delay and the adjustment of the appropriation was also accomplished late in the fiscal year, so that we are only now in the position to begin to move the collection. Show cases in addition to those already on hand have been built, racks to hold weapons, shields, etc., placed on the walls, shelving put in to accommodate specimens, and the entire space renovated and put in condition for a public museum. It is proposed to have this museum open to the public during certain hours of the day, and it is hoped that the migrations of the division of ethnology are now at an end.

About one-fourth of the floor space available has not been utilized at present. It is obvious that room must be left for expansion of the ethnological museum and for other purposes. It is not deemed advisable to place the working collections of the bureau of science, such as the botanical herbarium, the ornithological, geological, and other collections in this building for many fundamental reasons. Some of these are: The distance from the central scientific bureau, which would operate especially to the detriment of both the botanical work and the investigations carried on in the bureau of science building which need the assistance of the botanists; the journey to and from the library is also one of the considerations and this is even a more serious matter. Much of the future work in botany will need laboratory facilities for the study of the histology of Philippine woods and of plant physiology and pathology, and none of the facilities for such investigations will be available in the new building. Therefore, it seems fundamentally necessary to provide room on Calle Herran for that class of work in the Bureau of Science which depends upon scientific collections.

THE NEED OF A COMMERCIAL MUSEUM.

In the past few years this bureau has from time to time collected many specimens and prepared many products of commercial value in the development of the islands; all of this material has been sent to various collections, exhibitions, and museums in the United States and none reserved here, so that the islands are confronted with the fact that, whereas we are in every way

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endeavoring to enhance the availability and volume of our natural resources, we have nowhere in Manila a place where strangers visiting the islands can go to view specimens of the natural products and to obtain the commercial information which is necessary for their intelligent understanding. Such a place should be in connection with the ethnological museum, which is already established. However, a commercial museum would be of little value were it not provided with a good division of information, a thoroughly competent man at its head, and sufficient clerical assistance to collate and supply all details necessary to assist visitors in Manila. A classified and catalogued card system, which would give all available information regarding the natural products, so collated that every detail available to the Government and to private persons would be collected in this central spot, would be of the greatest assistance in advancing the interests of the islands. The subject of Philippine coals furnishes an example. There should be a place where a visitor could ascertain at once and with the greatest facility the results of all analyses which have been made on Philippine coals, the percentage of efficiency resulting from boiler tests, the location of the coal beds, the means of transportation to and from their location, the expenses of labor in the various districts, the wharfage facilities, and so forth. Again, if, for example, a stranger were interested in a product from some of the unexploited oil seeds or nuts found in the islands, information as to the availability of these seeds, the opportunities for collecting, the percentage and the quality of the oil, and all other data regarding them should be available in such a division of the government. The various grades of manila hemp and the methods of reaching a classification should be on file, and in each instance museum specimens should accompany the records. The above are only a few examples which come to mind owing to past experience, and new questions are constantly arising.

The system to be inaugurated would need to be thoroughly organized with means of obtaining very accurate and complete information, otherwise the project should not be undertaken. One essential feature should be a complete collection of catalogues and price lists. The market values of all local and foreign commodities which may be a factor in the development of the islands should be available, as under present conditions it is sometimes necessary for the visitor to call upon a number of bureaus to obtain his information section by section, with the possible necessity of making a long journey through the provinces in order to obtain even a preliminary view of the field.

Much information which could really be made available is not now gathered for the reason that there is no uniform system, and each bureau of the government is simply obtaining such data as it deems necessary for its own work. Such offices as the bureau of education and the constabulary could be utilized for systematically furnishing details from the provinces in regard to products, routes, or maps, and the mere fact that the attention of teachers and constabulary officers is being called to the desirability of such facts and the existence of a central office for their proper handling will do much to stimulate activity in the line of gathering information.

AN ADDITION TO THE MAIN LABORATORY BUILDING.

In the past annual reports attention has been called to the overcrowded condition of the building of the bureau of science. The inauguration of the new medical school, and the necessity not only of providing space in this building for the advanced work of the faculty, but also of taking in a number of advanced students who need better facilities than can be afforded in the medical school, renders the necessity for increased space in the building of the bureau of science more and more apparent. The botanical, pathological, mineralogical, geological, and ichthyological collections are growing rapidly and the space available each year becomes proportionately less. The subject was so strongly urged before the Commission that authority has finally been granted to have plans drawn for a wing approximately 110 feet long and 50 feet wide. This addition would provide for the herbarium, the work in entomology, the collection of natural history specimens, the division of mines, and the new undertaking in the study of fish and fisheries. It is essential to the unity of the work and to the plan of a central scientific institution that the working collections, together with the staff connected with them, should not be separated from the main structure. The need of intimate intercommunication has developed more and more as the age of the bureau increases, and the vigorous carrying on of new

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work is only possible under the stimulus of proper surroundings. Future plans should also contemplate the union of the ethnological and commercial museums under the same roof as the working collections of the Bureau and connected with the present building.

THE NEW WORK IN FISH AND FISHERIES.

We have during the past year, in addition to the amalgamation of the ethnological survey with the bureau of science, added work in fish and fisheries. This has begun in a modest way by engaging the services of Mr. Alvin Seale, who has a large experience in the identification of tropical and especially Philippine fishes. Authority has also been obtained for a voyage of the United States Fish Commission vessel *Albatross* to the islands for the purpose of exploration and investigation, the Philippine government furnishing the necessary coal during her stay in these waters. It is obvious that, while this government will obtain many advantages from this exploratory expedition, full and permanent results will not be available until we make up our minds to continue the division of fisheries as a permanent institution with equipment and facilities of its own. It is very certain, owing to the fact that the Philippine government will provide the coal for the *Albatross*, that it will be entitled to complete duplicate sets of the collections to be made, and also to a prompt report on the best means to be taken to increase the commercial availability of the marine fauna, but this is not all. It should be in a position to secure advanced advice and results before the appearance of the probably extended discussion which will be printed in Washington. I hope that during the visit of this vessel to our waters plans may be begun and funds become available for establishing the system of floating scows which I have advocated in the past. The division of fisheries is certainly of great importance when we consider the food value of the marine fauna to the people, and it should be continued with adequate facilities, aquaria, and personnel after the first exploratory work is over. One feature which I have dwelt on in the past, which I still consider to be not only advisable but almost necessary in this work, is the establishment of a public aquarium for the use of the people of the islands.

THE PHILIPPINE MEDICAL SCHOOL.

The director of the bureau of science was appointed dean of the school in December, 1906, and as so much of the work of the new institution is connected with that of the bureau of science, an account of the progress of the school is included in this report.

The Philippine medical school was brought to a working basis during the past year and it opened its doors to pupils on June 10, 1907, the total number of admissions being 54. The Commission appropriated sufficient funds to establish four years of the course at the present time, for although the board of control and the faculty decided that a five years' course was necessary in the Philippine Islands, it was obvious that no students would immediately be available for the fifth year. The object of the school is as rapidly as possible to train Filipinos as physicians, but with the conditions which confront us it does not seem feasible to allow the students to graduate with less than a five years' course of study. However, it appeared necessary, in order to give an opportunity for many applicants who had not been trained in the government schools, for the present to be somewhat lenient in the entrance examinations, the standard to be gradually raised as a larger number of the Philippine population becomes familiar with our methods of preliminary study and with the English language. It was also deemed essential to admit as advanced students a number of applicants who had previously studied medicine in other schools. While they have not the preliminary training which we will require of our own initial classes, nevertheless, by such admissions we will be giving an opportunity for many to take laboratory work and to become familiar with laboratory methods of instruction who otherwise might not have been able to gain these advantages. The students in question will undoubtedly be more or less weak in the initial work, but they nevertheless will be available for sanitary work in the islands much sooner than if we were compelled to wait for the first freshman class to graduate. They have been admitted as special students and will only be considered candidates for a degree if after one year of study they prove themselves to be fit to continue the work.

As soon as the doors of the school were opened one great necessity at once became apparent, and that was increased clinical facilities. The material at

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St. Paul's Hospital is practically all that is available. The Civil Hospital is a pay institution, and at such a distance from the medical school that the loss of time in journeying to and fro is prohibitive. This lack of clinical material emphasizes even more strongly the fact that the Philippine Islands need and must have a well-equipped general hospital, with a minimum of 350 beds for the first year. Indeed, for a city of the population of Manila, with its many nearby suburbs, an institution of 1,600 beds would ultimately not be unreasonable. The necessities of medical instruction will then inevitably lead to the conclusion that the faculty of the school must also comprise the staff of the hospital, and such being the case it would seem more advisable to have the hospital under the immediate direction of the board of control of the medical school than to place it under any one bureau.

It seems evident, to judge from the results of the first year, that we must expect larger and larger entering classes as time goes on, and the temporary quarters of the school will soon be inadequate. An appropriation of ₱250,000 has been made for the construction of a new building which is to be in close proximity to the present laboratories of the bureau of science.

The advantages of the medical school will be felt not only in the training of pupils and in the general intellectual advance of the people, but also in the fact that its establishment will be another step toward making Manila the medical center of the Orient. Already we have called to the school an anatomist and a pathologist, who are thoroughly trained in their respective lines, and we hope within the next year to be able to call to the faculty a physiologist and a pharmacologist.

The gradual rounding off of the medical school is, therefore, begun, and no one who realizes the reputation which in the past the Philippines enjoyed from a sanitary standpoint, and who compares this reputation with the real facts as they exist to-day, will hesitate to say that the future advance in medical education, with the forming of a thoroughly competent medical faculty and hospital staff, will be one of the greatest factors in promoting the interests of the islands.

The bureau of science has been especially affected by the opening of the medical school, because six of its members are more or less actively engaged in teaching. The pressure on this bureau in this respect has been far greater than that on any other; in fact up to the present time no other bureau has been in a position to give any great amount of assistance. This condition of affairs is obviously one which necessitates extra work and makes it necessary to keep the biological staff of the Bureau at a maximum at all times.

A GRADED SALARY LIST IN THE BUREAU OF SCIENCE.

The appropriation for the present year will enable the bureau gradually to introduce a graded salary list in all divisions, and thus it will be able to offer greater inducements for men to come to the islands to take up scientific work and to remain in the service. While it is true that no changes have been made in the lower salaried positions, nevertheless the plan of grades will be such that members of the scientific staff will have a steady opportunity for promotion as resignations occur in the places above them, until they reach the highest positions. The differences between the salaries have been so adjusted as to apply equally to all divisions of the scientific work, and in the future it will be the fixed policy of the institution to allow no changes in salary for the benefit of the individual, but to improve the condition of the members of the staff by regular, graded promotions. Such opportunities should form a great inducement for prospective candidates to enter the service of this bureau, as before they are admitted they will have before them a clear and permanent schedule of the places above them and a definite knowledge of what they may expect.

However, advancement to the upper positions will only be possible to those in the lower ones who have shown themselves capable of independent endeavor and investigation. If such promotions were to be made simply because of length of service, the ultimate condition of the laboratory would be to have all of the higher positions filled by persons incapable of advancing the work of their respective divisions and not fitted to direct the research or the scientific work of those below them. Such a condition would involve the stagnation and ultimate dissolution of the laboratories.

The keeping in a subordinate position of a man who has not shown himself capable of advancing his work to the higher plane of investigation and direc-

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tion, will, of course, be a situation which will bring its difficulties upon the director, as ultimately he alone will have to give the decision and run counter to the hopes of a number of employees who may be doing faithful and conscientious work, but a rigid application of the policy of reserving the higher places only for those who are capable of following advanced and independent research is so obvious that the situation will have to be faced in each individual instance and action taken accordingly. Such a condition must confront everyone who has charge of an institution in which a large part of the work is that of scientific investigation, and no mechanical method of promotion can be devised which will give the efficiency necessary for the maintenance of this bureau on the high plane which it has assumed in the past. This condition must be thoroughly understood by prospective candidates before they enter the service, so that if they are not capable of the work of the investigator they need not unduly expect promotion to the upper grades. It may follow from this that in the future it will not infrequently happen that calls to the bureau will be made directly to the higher salaried positions.

In the plan of the appropriation it was taken into account that the adjustment of salaries and promotions in the scientific force would not, excepting in special instances, be made sooner than one year after the previous promotion had taken place, and if this policy is carried out the bureau can meet its salary obligations on the new basis. It will be true that the next following year, if it should chance that all places available on this basis would be filled, the present appropriation would be insufficient. This must be taken into account before the end of the present fiscal year. However, it has invariably been true in this bureau, as in others, that all positions are not occupied at one time, and it is also true that toward the end of a given fiscal year a number of employees usually take their vacation and have their leaves commuted. Such commutation obviously relieves the next fiscal year. The exact sum necessary to meet all the salaries as they have been authorized can therefore not definitely be stated at present. A very few future alterations in the salary list can advantageously be carried out when the time comes, by the consolidation of two or more lower paid positions into one higher one. Under these conditions we may look forward to a gradually increased usefulness in furthering the interests of the Islands.

The attention of the bureau in the past few months, and probably for a few months to come, has necessarily been distracted by the beginning of the new medical school and by the plans for organization and buildings, both old and new, which it has been necessary to consider. It is probably a conservative estimate that the results of the present plan of organization will not begin to be felt until six months have elapsed, when it is hoped that all changes will have been made and the institutions with which we are connected will be on a permanent working basis.

ROUTINE WORK.

Routine analyses and examinations of the kind we have been accustomed to in the past have recently diminished. This diminution is owing to the fact that the custom-house has gradually had many of the questions adjusted which needed laboratory advice, that the bureau of agriculture has not continued its policy of extensive soil analyses, that the bureau of health and other bureaus have also in the past few years of experience gradually advanced themselves to a condition where fewer analyses are necessary. In the biological laboratory we shall as a result have an increased opportunity for the careful study of tropical diseases, whereas in the past much time has been taken by the wholesale routine examinations which could not thoroughly be considered and digested, an example of such being the examination of rats for plague. It is therefore hoped that the next years will bring more permanent results in the understanding of our hygienic conditions. An advance is already being made in the study of animal parasites which affect a large number of prisoners at Bilibid, and which are believed to be a serious factor in the present mortality among the people of the islands. While such parasites may not be the immediate cause of death, nevertheless, in weakening the condition of the populace they do give opportunity for the more ready attack of the people by other serious diseases. A further discussion of these questions will be made under the heading of the biological laboratory.

The decrease in the custom-house and other routine analyses in the chemical laboratory has been more than offset by the work of standardizing weights and

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measures, which at times has been very heavy and exacting, and by the greater number of determinations we have made for private persons and firms, and as soon as we are able to make feasible the operation of act No. 1655, which has as a short title The Pure Food and Drugs Act, we shall within the next few months, have coming daily to the laboratory a large number of analyses, so that the routine work for the next year in this branch of the service will presumably show a very large increase.

One matter which should be brought to the attention of the various bureaus is that the chemical laboratory is in a position to examine and test materials purchased in large lots. It has always been a matter of surprise to me that organizations such as the bureaus of supply, of public works, and others, which deal in contracts for paints, oils, varnishes, alcohol, steel, and iron, have not systematically subjected their contractors to rigid laboratory examinations as to the quality of their goods. Samples of all articles of the above and other classes which are purchased for the government unquestionably should be submitted to the laboratory as a regular routine performance. The results would save the government loss in the purchase of inferior articles and would assist in every way in the saving of money. The laboratories have been organized with this as one of the ends in view, and advantage has not been taken of the chemical laboratory for the examination of materials to as great an extent as should be the case. It is also suggested that many instances might arise where officials of the government other than those connected with bureaus could very well refer matters of scientific importance to the laboratories as a preliminary to further consideration.

A CEMENT-TESTING LABORATORY.

The testing of cement is at present undertaken in several divisions of the government, and probably, as a cement-testing apparatus is not very expensive, and the whole time of one man in each division is not necessary, the distribution of this class of laboratory work among several branches of the government is not a detriment as regards expense. Nevertheless, attention should be called to the fact that if all of this work were to be carried on in the central laboratory, it would be of so great a volume as practically to occupy the time of one man with one or two assistants, and consequently a probable reduction of cost would be apparent. A greater additional advantage is found in the fact that the person making the tests would be a man thoroughly trained for this purpose, who would ultimately have a very extended experience with all of the classes of cement imported into the islands, and so a central place would exist where all knowledge as to the standard and quality of these materials would be concentrated. Such a procedure would also assist the laboratories in working out the problem of the development of the native cement industry. Therefore, for many reasons it would seem advisable to have all work on cement testing done in one institution.

MAP WORK.

The bureau of science, as has been the case with other bureaus and divisions of the government, has been much hampered by the confusion and contradictions which are found in the existing maps of the islands. Good maps are very useful for our collectors, and topographical maps are necessary for the division of mines. It is to be hoped that during the present year some steps may be taken toward uniting the results of all map work being carried on under the government and thus establish a progress map of the islands. A beginning in this direction is already planned. A complete topographic map of the islands, even with large contours, would be very expensive, and the cost could scarcely be met by this government, but it is perhaps possible that these surveys which are so fundamental to work in the islands may at some time be undertaken from funds appropriated by the Congress of the United States, and by officials of the Geological Survey. If money were ever to be appropriated for this purpose it is certain that we in the Philippines who are interested in the matter would give all the assistance in our power.

STOCK HELD BY THE PURCHASING AGENT.

One change which threatens seriously to hamper our work is the reduction in stocks held by the purchasing agent. We have been accustomed to hold in reserve many chemicals and pieces of apparatus, for which the bureau has not suf-

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ficient storage room. Some of these materials may not be needed for two or three years, but no one can predict just what work we will be called to do during any given year. To purchase materials from abroad takes from six to nine months, and in the case of the common acids, supplies accurately calculated to last one year may be thrown overboard in transit, as has frequently happened. When a laboratory needs a certain thing it needs it badly, and the work must be suspended until it arrives. For these reasons, in the case of the bureau of science at least, it would be advisable to allow the purchasing agent to carry more than one year's supply.

THE LIBRARY.

The past year, as a whole, has been one of the most satisfactory in the history of the library. More has been accomplished than in the preceding one, although the work of systematic organization has only been begun. Nevertheless, many details which referred to old bills and vouchers have been settled after numerous discouragements, and they will not again delay the work. The accessioning of the large number of volumes which came into the library in the early history of the bureau, at a time when vouchers were not so clearly prepared and when large masses of books were brought in at a time, has been completed.

RENEWAL OF OLD ORDERS.

The old orders for books, which were outstanding had not been filled and apparently were not being filled by the book dealers with whom they were placed, were canceled and replaced in the fiscal year 1907 by new orders for 458 titles. The result has been most satisfactory, so that with the exception of requisitions for books made during the year 1907 there now remain only 56 of the above titles any part of which still are undelivered, and a number of partial deliveries of these have been made. The undelivered portions consist of books out of print, of parts of sets of periodicals, and of the publications of learned societies which are difficult to obtain in the book trade, and which can only be secured as libraries and collections of books are offered for sale from time to time.[a]

NUMBER OF VOLUMES AND USE OF THE LIBRARY.

We are not yet in a position to give the exact number of volumes in the library, as the accession books have not yet been completed, owing to the lack of clerical assistance, but it is probably a conservative estimate to place it at 25,000 volumes, exclusive of about 600 maps and of trade catalogues, which alone amount to more than 2,000. When the accession records are completed to June 1, 1906, and an inventory made from that date, we shall be able to give an exact statement of any losses which may have occurred, but only two books and six pamphlets have been reported as missing in the work up to June 30, 1904, and there is still a possibility that one or two of these may be found.

All of the titles which have been accessioned, including the pamphlets to June 30, 1904, have had book numbers assigned to them and shelf list and main author cards made, but in about 10 per cent of the titles the class number has not yet been determined, and consequently the cards are not yet ready for filing and use. No subject or title cards have been made for the entire series, but the work has been well begun.

The necessity of an assistant librarian has become so apparent since we have seriously pushed the work of accessioning and cataloguing that the Commission authorized the position in the present appropriation bill, and steps will be taken to secure this employee at as early a date as possible.

Although this library is intended primarily for reference, the record of borrowers' cards for the year since the last annual report shows 3,848 titles taken out by 147 persons, this being in addition to the books taken out by various bureaus upon memorandum receipt, and reports from the latter also show a considerable circulation. It is certain that with the establishment of the medical school the circulation of the library will gradually increase during the pres-

[a] Of the sets completed during the year, a complete list can be obtained at the Insular Bureau, War Department.

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ent year; it is already true that a number of the students are in the reading room daily working at the literature of the subjects with which they are occupied.

Fifteen hundred volumes have been forwarded to the printer for binding during the past year. We have also received the initial shipment of the printed cards of the Library of Congress, a partial set of which, including all scientific titles, was sent to this library without expense, the only requirement being that the cards should be filed and available for consultation. The proof sheets of all the cards printed by the Library of Congress are received regularly, and all those desired are checked and ordered by serial numbers. This list should be of great assistance in bibliographical work.

It is certain that better service can be given at the loan desk with more assistance. The increasing use of publications taken outside of the building makes it important that this work should be attended to carefully and systematically. This is especially true because the library is so situated that it can not be locked, so that all possible protection must be given to guard against the loss of books. It would seem unfortunate to place doors and locks on the library, as it is so frequently used by responsible persons outside of the hours kept by the bureau, but if our accessioning should at any time reveal any considerable losses we shall probably have to install iron gates.

MISSING NUMBERS OF PUBLICATIONS.

The greatest single piece of work undertaken during the year has been an effort to fill in the missing numbers of publications wherever it is necessary to complete volumes which need to be bound. This involves not only completing sets from the date of their publication, but also the purchase of individual numbers. Many titles have been transferred to this library from time to time which contain incomplete volumes. Missing numbers were ordered for such volumes of these as the bureau making the transfer desired to have completed and bound. A very serious question in the Philippines is the number of losses in the mails affecting our regular receipts, both of subscriptions and exchanges. In some instances where journals have not come in the mail we have waited for from one to three years to secure the missing parts from the publishers, or through exchanges, but without success. Eventually we have been compelled to order several thousand single numbers to fill the various needs, requisitions for 123 titles, including from 1 to 135 numbers each, being placed at one time. The making up of these orders requires careful and painstaking work to avoid duplicating numbers on hand, or obtaining something not wanted by the scientific workers, or reordering before there has been time to hear from the latest previous request, or failing to specify indexes and title-pages where needed, etc. Probably not more than 25 per cent of these orders have been filled up to the present time, and it is more than likely that we shall have to do much more work and in some instances wait for years before these volumes are all completed.

During the present year we have done much to add to our stock of United States Government publications. We have received several hundred missing numbers from the Departments of Agriculture and of Commerce and Labor, the Geological Survey, and the various divisions of the Smithsonian Institution, and in one or two cases our sets have been completed with the exception of a very few numbers. A member of the staff is now on leave in the United States, and he will make a personal effort to secure more of the missing numbers while he is in Washington. A list has also been submitted to the document division of the executive bureau, Manila, and it is hoped that some numbers may be secured from this source.

EXCHANGES AND THE JOURNAL OF SCIENCE.

A large number of the publications of foreign governments has been received during the year, and among these the reports on fish and fisheries are of especial importance. Exchange relations have been extended in many cases to include old numbers as well as current issues, and much of value has been added to the library in this way. Actual exchanges for the issues of the Philippine Journal of Science now number 315, and many of the publishers have either sent or expressed their willingness to forward to us their earlier volumes in return for the previous publications of the various divisions of the bureau of science.

The Library of Congress also sends to us regular issues of "want" and "offer" lists, which we have already taken advantage of. It no doubt will often

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be possible in this way to secure missing numbers not available elsewhere. We are making up a complete list of our duplicates and wants, and in time hope to enter into exchange relations with many libraries and institutions.

The library, in addition to regulating the exchanges for the Philippine Journal of Science, has maintained general supervision over the mailing of all copies of the Journal not forwarded from the bureau of printing. This includes copies sent to the various other publications for review, samples for advertising purposes, numbers furnished to subscribers through our various agencies, until the money is received by the bureau of printing, and the forwarding and keeping of the records of advertising matter concerning the Journal. A record of the disposal of all previous publications from all divisions of the bureau of science has also been kept. We have been able to reduce the detailed work on the Journal during the past three months by completing a printed mailing list, so that now the business office takes care of the transfers and the supervision of the mailing of the Journal of Science.

THE DIVISION OF BIOLOGY.

Only a few changes in the personnel of the biological laboratory took place during the past year. Dr. Philip H. Garrison, detailed from the Navy, reached here on January 10 to take the position of medical zoologist of the bureau of science, and since that time his work has advanced rapidly in the study of parasitic diseases infecting the prisoners in Bilibid. A statistical paper on uncinariasis and the proportion of prisoners affected will appear in the near future. Other work, including the investigation of the life history of parasites and the identifications of new species is necessary and will take some time, but certainly good results may be expected. Doctor Garrison has also begun a helminthological collection in the pathological museum, so that in the future we may have a complete record of all the parasites we have encountered, as well as material for exchange with other museums. Eventually this procedure will enable us accurately to identify many of the parasites of the Philippines and of other countries.

The position of clinical laboratory assistant, so long vacant, was finally filled by the arrival of Doctor Bowman.

PLAGUE VACCINATION.

The chief of the biological laboratory, Doctor Strong, on July 2 left on vacation for Europe and the United States. Before going he completed a long and painstaking work on the plague organism and the most advisable method of inoculation against plague. The extensive results, which involved experimentation with many small animals, appeared in the third number of the medical section, section B, of the Philippine Journal of Science, of this year. The work will certainly be authoritative on the subject of plague inoculation, and it is hoped that the method based upon the use of attenuated organisms will be given a rigid and extensive trial in countries where plague is unusually prevalent, and if such trial is given the laboratory has every confidence in the results. Doctor Strong will work in various foreign laboratories during his leave, and therefore will be partly carrying out the policy which has been the ideal one for the bureau since its inauguration, namely, to have every scientific worker given an opportunity to visit the laboratories of other countries once in a certain period of years. In the instance of Doctor Strong this has been done by not utilizing his leave for the past four years, but it would seem desirable in an institution of this kind to have an arrangement by which each employee who would need the benefit of foreign study would have one year in five on full salary for this purpose.

PUBLICATIONS AND INVESTIGATIONS OF THE BIOLOGICAL LABORATORY.

The work of the biological laboratory has appeared in eight papers during the year, all of which have been issued in the Philippine Journal of Science. The titles are as follows: Studies in Beriberi, by Maximilian Herzog; The Cultivation and Pathogenesis of Amoebae, by W. E. Musgrave and Moses T. Clegg; The Types of Bacilli of the Dysentery Group, by Y. K. Ohno; The Toxic Action of Saponin, by Harry T. Marshall; Agenesis of the Vermiform Appendix, by Harry T. Marshall and Ralph T. Edwards; Paragonimiasis in the Philippine Islands, by W. E. Musgrave; A Consideration of some of the Modern Theories in Relation to Immunity, by Paul C. Freer; and Studies in Plague Immunity,

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by Richard P. Strong. A number of papers which represent last year's work are still in press. Among these are articles by Doctors Musgrave and Marshall on Gangosa in the Philippine Islands, and a paper on Infant Feeding, by Doctor Musgrave. The following investigations are under way, but not yet completed: Doctor Musgrave and Mr. Clegg are occupied in a study of parasitic appendicitis, for which material is on hand, and a consideration of the treatment of malaria, with statistical studies of the cases in St. Paul's Hospital. Abundant material for this work is also available. Clinical observations on beriberi are partially advanced, but much more needs to be done. The same is true of the work on the subject of the use of the Roentgen rays in the treatment of this disease. Doctor Musgrave has also continued some of his previous work on amoebiasis, reports on 10 cases of amoebic cystitis, 2 of amoebiaemia, and 50 of amoebiasis without diarrhea, being practically ready. The investigation on the symbiosis of amoebae and its influence on the pathogenesis of the organism, the influences governing its virulence and observations on the biologic history of amoebae are being continued. Doctor Musgrave has also just undertaken a series of studies on the biology and the cultivation of the *Bacillus leprae* and on the transmission of leprosy to lower animals.

Doctors Musgrave and Bowman have begun a study of endemic parotitis. Doctor Marshall has studied and completed a work on a nodular form of amoebic dysentery and has finished a paper on gangosa in the Philippine Islands in conjunction with Doctor Musgrave. He has ready for publication a discussion of the histology of yaws and has undertaken the study of the toxins of the dysentery bacillus and of the cholera spirillum. He also proposes to begin work on the etiology and serum treatment of beriberi.

Doctor Edwards is engaged on the subject of conjunctivitis of the Tropics, and the study of certain fluke infections.

Doctor Ohno has been at work on the various types of dysentery bacillus; in addition he has endeavored to begin the preparation of rabies virus from material found in Manila and has carried the work along to a point where success seems reasonably certain. He has also undertaken the isolation and preparation of nitrogen absorbing bacilli, so that in the future a supply may be available for agricultural work. The manufacture of mallein in the bureau of science has also been in the hands of Doctor Ohno.

The work of Doctor Garrison has already been mentioned in brief. He is engaged in a study of the life cycle of the trematodes, and it is hoped that this obscure question may be cleared up in this laboratory.

The routine work of the biological laboratory has been lessened during the past year by absence of epidemic diseases, so that it has been easy to keep it on a proper plane. However, a force must always be in readiness properly to handle any emergencies which may be brought about by epidemics.

The investigations which have been begun and outlines of which have been given above may seem too ambitious for the force we have and unquestionably some of the topics will not lead to far-reaching results, but out of the entire number some researches should result. The biological laboratory can only accomplish good results by a continuous and earnest attention to laboratory and, if possible, clinical investigation, by an effort at all times to secure material, even at personal sacrifice of time and inclination, and by a continued policy of actively and energetically pushing forward in its own field. It is not to be presumed that a man can always have at hand an absorbing and important topic. Research work in medicine must go with the materials available, but it is certain that any member of the biological laboratory who hopes to continue his connection with the bureau must continually be prepared to make the most of his opportunities and to spend his time when not engaged in routine work in investigations in which he makes an effort to find, and not simply in waiting for what may come to his hands.

THE PATHOLOGICAL MUSEUM.

Mr. Willyoung in the last few weeks has undertaken the preparation of a card catalogue of the pathological museum and the relabelling with printed labels of all of the exhibits. This step has become necessary, owing to the growth of the collection, and it must be pushed rapidly to completion if we wish ultimately to avoid some loss. In addition to his work in sectioning and the preparation and care of specimens for the pathological museum, Mr. Willyoung was sent twice on trips through the islands to assist the bureau of health in the positive diagnosis of leprosy in the cases of individuals to be transferred to the leper colony.

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THE SERUM SECTION OF THE BIOLOGICAL LABORATORY.

The serum section of the biological laboratory on January 1, 1907, gave up the care and immunization of cattle expended in preparing rinderpest serum, this work being transferred to the bureau of agriculture. Up to that date the preparation of antirinderpest serum was in immediate charge of Mr. Albert M. Newby. The bureau in the first days of the fiscal year had its cold storage stocked with about 1,200 bottles of antirinderpest serum, and as no epidemics of rinderpest of a serious nature were reported, it was decided gradually to eliminate from the herd a number of animals which were not desirable and to keep it at a minimum in the belief that the reserve serum would be sufficient to last the bureau through the interval of time necessary to bring new animals to a point where it could be taken. However, early in the year the call for serum from the bureau of agriculture became very serious, and the reserve was rapidly exhausted, so that this bureau was once more compelled to purchase a large number of animals and increase its herd. Seventy-two serum animals were transferred to the bureau of agriculture on January 1, and since that time the latter bureau has also been making extensive purchases. The system adopted is as follows: The bureau of agriculture sends to the bureau of science all serum after it is separated from the clots, the shipments being in 5-liter, sterile bottles. This serum is then centrifugated, filtered, tested for sterility, and bottled in the serum laboratory of the bureau of science.

One difficulty in the past and a cause of grave loss of serum has been its contamination by organisms. In the Philippine Islands during the dry season, when dust from the streets pervades everything, it is almost impossible to carry on an operation, such as the taking of serum from rinderpest animals, where large quantities are required, in an absolutely sterile manner. Filtering does not seem to be feasible, as it soon clogs the filter, but in the latter part of 1906 it was ascertained that centrifugating the serum, and subsequently filtering it, rendered the latter operation easy, and beginning with that time, all rinderpest serum has been centrifugated and filtered, so that losses from contamination are now avoided. As our present centrifuge is a small one and entirely inadequate to do the work, it was decided to purchase a large machine capable of holding 10 liters at one time, and also to order a second serum filtering apparatus, a duplicate of the present one, so that when necessary we could handle large quantities at a time. The apparatus has been ordered and it presumably will reach here before the end of the present year. It has a capacity of 10 liters and will require about 12 horsepower. When this new machine is in place it is hoped that we will be able directly to centrifugate the blood of the animals and not be under the necessity of allowing it to stand for the formation of the clot. The process of centrifugating blood should increase the yield of the serum very materially, and in that way cut down the expense of operation so that the centrifuge will pay for itself in a little over a year.

The preparation of vaccine virus has continued steadily throughout the year and no difficulty has been encountered in keeping on hand a sufficient supply of active virus to meet the demands.

We have had some trouble with our serum horses during the past year, especially with the ones we were immunizing with the living, virulent cultures of the pest bacillus. It has been found impracticable to employ old or condemned horses, as a number of this class developed severe arthritis in the legs, from which they could not recover. It appears that if living, virulent cultures of the Bacillus pestis are injected intravenously into a horse not perfectly sound serious inflammation results. We have therefore been compelled to change to the use of perfectly sound horses, and with these we have as yet had no difficulty.

Antidiphtheritic and antitetanic serum has been supplied by the laboratory for some time and no change has been made in the methods of preparation. An increased demand for antitetanic serum has been evident during the year.

We are now immunizing horses against cholera, and hope, if we should have the misfortune to have a more or less severe outbreak of that disease, to have an opportunity of testing the curative value of the serum at the contagious disease hospital of the bureau of health.

The serum for bacillary dysentery and for typhoid will soon be ready for distribution. The demand for cholera prophylactic and plague prophylactic has been practically nothing during the year, as no epidemics or even cases of the diseases in question have occurred. The demand for mallein has also been limited, as glanders has become less frequent, but we have kept on hand a sufficient quantity of this product to meet the demand.

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INVESTIGATIONS OF THE SERUM SECTION.

A study of the etiology of rinderpest has been continued as vigorously as opportunity would permit, but no very positive results have been reached. We have not been able to cultivate the organism, and we have only been in a position absolutely to prove that the infectious material will not pass through the Berkefeld filter. Work in rinderpest will be continued, and although the subject is one which has engaged the attention of the most prominent investigators in the field of bacteriology, it is nevertheless hoped that by continuous application and with proper methods we may be able to make a decided advance in this line. It would be a matter of fundamental importance if, by cultivating the bacillus, if such it be, we could eventually be able to support the virulent organism in vitro. The subject is certainly of sufficient importance to warrant an outlay of time and money, although it is possible that no fundamental results will be obtained. The fact that the organism does not pass the Berkefeld filter would seem to indicate that it should be visible under the microscope. An ultramicroscope reached this bureau some four or five months ago, and it was hoped that with this instrument further advance could be made in the study of rinderpest. However, up to the present time we have had no opportunity to use the apparatus in any of our work.

THE BOTANICAL SECTION OF THE BIOLOGICAL LABORATORY.

The botanical section of the biological laboratory, as in the past, has been mainly engaged in pushing the herbarium and systematic botany. It has continued its good relations with the botanical workers abroad and its policy to obtain a return for the materials sent out. The identifications of the foreign investigators on Philippine materials have all been sent to the Philippine Journal of Science. Mr. Merrill went on a long leave toward the end of the year, after completing one of the most important expeditions, from a botanical standpoint, that has been undertaken in the islands—namely, the ascent of Mount Halcon, in conjunction with Maj. Edgar A. Mearns, of the Army; Mr. Merrill having the privilege of acompanying the expedition organized by Maj. Gen. Leonard Wood.

The herbarium at present contains somewhat more than 46,400 mounted sheets, well arranged in herbarium cases, but as has been mentioned in the past reports, it is located in extremely cramped quarters. The additions received during the year were 7,226 foreign and 8,749 sheets of local material. This is a larger amount, of both local and foreign material, than has been acquired during any previous year.

During the past year we have been engaged in a systematic collection of wood samples, properly identified and labeled, with herbarium specimens to accompany them. With the aid of the forestry bureau this collection has been rapidly augmented, so that at the present time it contains representatives of a majority of the commoner commercial woods of the islands. Of course there is need of a large amount of collecting work before this series can be considered as approaching completion, but even now it is crowded for space, as is the case with the herbarium.

Early in the past year we built a bamboo structure for orchids to the rear of the main building, and a large number of these plants have been brought in for study. Many of these orchids have been sent to America to Mr. Oakes Ames, of the Ames Botanical Laboratory, North Easton, Mass., for identification, and a paper on this material was published in the botanical section of the Philippine Journal of Science.

Many determinations of botanical material sent in by the bureau of forestry and by private persons have been made during the past year, and several thousand of wood specimens have also been undertaken for the bureau of forestry. Throughout, there has been the heartiest cooperation between this bureau, the bureau of education, and the bureau of forestry. For the past five months the timber-testing laboratory at Bilibid Prison, in charge of the bureau of forestry, has been conducted by Doctor Foxworthy, of the botanical section of this bureau. The publications of the bureau on botanical subjects may be ascertained by consulting the Philippine Journal of Science.

Doctor Foxworthy has continued his studies on the comparative anatomy and histology of Philippine woods, and the first paper on the subject will very soon appear. The work of Doctor Foxworthy relating to Philippine *Gymnosperms* and

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Philippine *Casuarinaceæ* is not nearer completion than it was last year, as the necessary literature is still lacking.

A number of observations and records regarding the growth and the physical and chemical properties of commercial woods have been begun. Studies in conjunction with the bureau of forestry on the determination and classification of forest trees and forest products are under way.

THE ENTOMOLOGICAL SECTION OF THE BIOLOGICAL LABORATORY.

The entomological section has undertaken experiments in the cultivation of silkworms as one of the new features of the work, and the investigation of mosquitoes with reference to their life history and to the transmission of malaria by the Philippine forms has been continued. A list of 83 species of mosquitoes has already been published, among which are 8 new ones and 1 new genus, and material now on hand will bring the number of species up to 100. A series of papers on the anatomy and biology of Philippine mosquitoes, including many drawings and various notes of the different stages of the life cycle, is well under way, but certain important gaps will need to be filled in before the work can be published.

The entomological collection has steadily grown, and much work in identification and arrangement of specimens has been done both by Mr. Schultze and by Mr. Banks. A large number of identifications were accomplished by Mr. Schultze during his leave in Europe. The work, as is the case with botany, suffers much from lack of space and of assistance in the routine of pinning and caring for insects. It seems probable that rather than to engage one man especially for this purpose we might train students of the high and normal schools to undertake this work at a small compensation, sufficient, perhaps, to help out in their school expenses. Two of these young men have already been tried and have proved themselves to be very useful, and possibly we can extend this service to advantage.

The work of the systematic collection of entomological material has necessarily been kept in abeyance, owing to our desire to cultivate the larger field of investigation looking to the prosperity of the islands. It is hoped that during the next year we can arrange some sale system by which we can obtain an income from the entomological work.

The past year has brought fewer notices of the ravages of locusts than previously.

THE ZOOLOGICAL SECTION OF THE BIOLOGICAL LABORATORY.

Field work during the past year has been conducted especially for the purpose of collecting birds, although land shells, reptiles, some mammals and representatives of other fauna were brought in by the expeditions sent out. The districts first covered were in Bantayan, Cebu, and at Toledo and Minglanilla in the latter island. Subsequently, a party was dispatched to Zamboanga and thence to Isabela on Basilan Island, and finally in May, 1907, Messrs. McGregor and Celestino visited the island of Batan, in the Batanes Group, collecting for about two weeks, and afterwards spending a month on the island of Camiguin to the north of Aparri. Five papers have been published in the Philippine Journal of Science and four are ready for the press. Important exchanges of specimens have also been made with the museum at Honolulu. The collection of bird skins and of other specimens is steadily growing, and the number of duplicates is now sufficient for us vigorously to push the question of their sale. Indeed, it might be proper for the bureau to attempt to prepare specimens in other directions for sale, also, and ultimately to establish a sales department similar to that in operation at the aquarium in Naples.

THE SECTION OF FISH AND FISHERIES OF THE BIOLOGICAL LABORATORY.

This section of the work was only begun in March of the current year, when Mr. Alvin J. Seale was engaged to undertake the organization of the work. Mr. Seale before coming to the islands spent a month in the study of the latest methods of the commercial fisheries on the Atlantic coast of the United States. He visited the fisheries of New York, Boston, Gloucester, and the Potomac. Letters to the managers of the principal fishing companies were procured through the courtesy of the United States Bureau of Fisheries, so that a close inspection of the factories, vessels, nets, and other paraphernalia was possible. Mr. Seale

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paid especial attention to a study of the curing, canning, and disposition of the catch. On coming to the islands he brought with him 200 large-mouth black bass, which were secured at Fulsom, Cal., and transplanted, with the loss of only 23 individuals. These were planted in three localities at Baguio, and on July 1 they were reported as being alive and doing well. At the same time 2,000 of the eggs of the rainbow trout were brought, and almost all of these hatched, but owing to the high temperature of the water the process was so accelerated that the young fish had not sufficient strength to survive. It is possible that, if the eggs were to reach here at the beginning of the cool season, when on occasions ice occurs on the higher Benguet plateau, young trout might be sufficiently large and strong at the beginning of the summer months to withstand the temperature. However, it is believed that small-mouth black bass would be better adapted to the streams.

In beginning the work in the Philippine Islands, and in order to avoid expensive mistakes in developing the fisheries, the first essential is a thorough knowledge of the fish which are to be found, and therefore a catalogue has been started covering points to be investigated in regard to every food fish in the islands. The catalogue contains the native name of each fish listed, as well as the English and scientific one; the life history—that is, where the fish is found, at what seasons, where the eggs are deposited, how the young fry develop, and what food is taken. It gives the method of capture, of preserving and selling, and the value, as well as suggestions as to future work. A collection has been started simultaneously and in connection with this catalogue. This will represent the food fish of the islands as rapidly as material becomes available. There are now about 500 specimens. A card catalogue has also been prepared of all the known species of fish in the Philippines, and one on the literature relating to the fisheries of these islands and the adjacent waters is also under way. Mr. Seale has visited the markets each morning and has noted the different varieties brought in, as well as their approximate abundance, and he has generally secured unfamiliar species for identification. He has differentiated those which are known to be poisonous or otherwise to be injurious. The fishing villages so far visited have been only Pasay, Malabon, and some parts of Tondo, where the native methods of fishing, as well as the nets used, have been studied. Mr. Seale also went out with the Japanese fishermen operating in Manila Bay, and has observed the method they employ and the fish they secure. There is a prosperous and growing industry carried on by Chinamen in the smoking and drying of fish in Tondo, and it is believed that this method of utilizing the food fish of the country is capable of great expansion. A study of the fish ponds has been carried on in the neighborhood of Manila, and a considerable amount of information is now available. Only the streams near Manila and the vicinity of Baguio, Benguet, have as yet been reached. A fair number of small goby were found in the Trinidad River near Baguio, and these proved to be of a species new to science. They will furnish a plentiful food supply for the black bass which have been planted.

There can be no doubt as to the great value of the Philippine fisheries. There occur here the well-known bangos or milk fish, the banak or mullet, many species of groupers (lapo lapo), snappers, pompano, tarpon, bonito, mackerel, and also herring and anchovies in countless numbers. The fisheries are not only capable, so far as the supply is concerned, of filling the needs of the home market, but a large export trade with China should be started.

The fish-survey vessel *Albatross* will leave for these waters about September 1 and will spend some time in exploratory work, but it should once more be emphasized that the islands can not depend on this work alone for advancing the interests of their fisheries in the best manner.

NEED OF A DIVISION OF FISHERIES.

The section of fish and fisheries of the biological laboratory should be changed so as to give it the status of a division and ultimately it must have a permanent force, equipment, and laboratories. Not only the fish, but, as has been pointed out in previous reports, sponges, corals, pearl oysters, and other marine organisms are valuable, and it is as true in this work as in any other that commercial advance and application can only come as a result of careful scientific study. In other words, it is my hope to see established here a well-equipped marine biological laboratory, with aquaria, and a central station for investigation in Manila, with one or more floating stations in various parts of the islands. The expense of this undertaking will undoubtedly be returned

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to the islands many fold in the advance of the fishing industry. When this industry is placed upon a more advanced footing and when the profits from the sale of dried fish to China and other countries begin to be apparent, it would not be unreasonable to impose a net tax on all fishing companies, and in that way pay the expenses of the marine biological survey. At the present time this would not be feasible, so that the suggestion applies only to the period when the business of the fisheries shall have been thoroughly established on modern lines.

It is one of the most important undertakings to have the study of marine fauna pushed as energetically and rapidly as is possible, and it is hoped that when the *Albatross* departs, the Philippine government will be in a position to carry on the work thoroughly and well with a sufficient laboratory force and appliances, and it will then be asked to foster this division as assiduously as possible.

THE CHEMICAL DIVISION.

During the past year it has been found necessary to divide the chemical laboratory into two sections—(*a*) the section of general analytical work and organic chemistry, and (*b*) that of weights, measures, and mineral analyses.

THE GENERAL ANALYTICAL AND ORGANIC SECTION OF THE CHEMICAL LABORATORY.

The routine work of this section has increased very much, but a falling off has appeared in the last month or so. Approximately twice as many analyses were handled during the past fiscal year as in the preceding one. The increase has arisen in part from certain classes of work sent in by other government bureaus, but it is also due to the fact that the commercial interests in the islands are gradually coming to realize the money value to them of accurate chemical laboratory work and the laboratories therefore are frequently called upon for assistance by merchants.

The routine work has been such that it usually required the time of three chemists and in addition a portion of the time of all of the force of the chemical staff, but whenever opportunity offers they do some of the work of investigation. The analyses have been systematized as far as possible by confining each chemist to a certain class of work, and frequent consultations of the members of the staff are held to develop the best and the quickest methods of procedure. It has therefore been possible for the men to handle more work than formerly. Weekly meetings of the chemists are held, at which the recent advances in the science and the possibilities of the development of the economic products of the Philippines are discussed.

PUBLICATIONS AND INVESTIGATIONS OF THE CHEMICAL LABORATORY.

Doctor Clover, during the year, completed and published the results of his investigations on the terpenes of Manila elemi, which has occupied his spare time during two years. He showed that the resin from an individual tree usually contains but one terpene, and in that way, by studying the individual samples, he was able to identify the various terpenes which go to form the mixture known as Manila elemi, and to study their properties. The terpenes from Manila elemi would unquestionably be useful in varnish making, and the residue which is left after distillation would also seem to be very excellent for this purpose, but it appears desirable, as we have at our command in the Philippines a large amount of this product, and therefore are in a position to secure practically pure terpenes, that this subject be investigated as to the possibility of securing a higher standing for the oils than in the manufacture of varnish, namely, to utilize them for synthetic work. But little has been done with this class of chemical bodies in this respect, but it does not seem at all hopeless to carry on the work and ultimately to be in a position to synthesize a number of higher important commercial products from the terpenes in question. Work of this kind involves the best type of chemical research, and of course successful results can not be guaranteed, but at the present time indications are not wanting that one way of utilizing these products has been found, and work in this direction will be developed during the coming year. In order to make the synthetic work possible a complete knowledge of the terpenes themselves is needed, and this was supplied by Doctor Clover.

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Doctor Clover left the service of the government on January 15, and Mr. Richmond was promoted to his place. During the first part of the year Mr. Richmond completed his work on the Philippine fibers and fibrous substances and their suitability for paper making, the later months being devoted especially to a study of the woods and of the applicability of the sulphite process to the preparation of paper pulp from hemp waste and the Philippine grasses. It certainly would be an advantage if these materials could be worked by the sulphite process, as is the case with wood pulp; and Mr. Richmond's results show that it is perfectly feasible and in fact advantageous to make paper from hemp waste and from grasses by this method. All of the results have been published in the Journal of Science. Mr. Richmond has shown that good paper can be prepared from cogon grass, from bamboo—both the dwarf bamboo and the structural variety—from the waste from hemp, from a number of Philippine woods, most prominent among which is lauan, and from other Philippine materials.

Mr. Richmond is now beginning the study of the Philippine oils and the resources of the islands in this direction. A preliminary discussion of the subject is already at hand and was written before Mr. Richmond left on his vacation for the United States. The subject is one which will call for much further study, and it probably will extend over a year or a year and a half, but its importance is such that the results will warrant the time and expense. A number of oils other than those now considered commercially can be prepared in the Philippines and can take their place in the world's market, and it is the object of this bureau to make the information concerning these products available in such a way that the manufacturer will interest himself in the subject.

Doctor Bacon during the year completed a preliminary discussion of the Philippine medicinal plants. He investigated about 15 of the most important native plants belonging to this class and did some work on the physiologically active constituents which he isolated. Judgment in regard to the value of all of this material will have to be delayed until we can have in the Philippine Islands a trained pharmacologist; indeed, it scarcely seems advisable to continue to spend large amounts of time on Philippine medicinal plants, unless such a specialist is on the ground and until we can be in a position to have cooperation between the chemists and the pharmacologist. When this time arrives the work, with the aid of the botanists, will once more be vigorously pushed. Dita bark seems to contain a very active alkaloid, echitamine, and a number of plants have been discovered which give a considerable quantity of berberine.

A number of the native fish and arrow poisons have also been isolated and studied. The fish poisons belong to the class of saponins. Biological work on this subject was carried on by Doctor Marshall in conjunction with Doctor Bacon and published in the Philippine Journal of Science. Dr. Bacon also visited Taal Volcano during the year and once more collected a number of samples of interesting waters from the crater lakes, especially obtaining material from the central hot lake where this had previously been impossible. The analyses of these waters furnished the basis for a memoir on the crater lakes of Taal Volcano. Opportunity presented itself while the question of the radio activity of these waters was being investigated, to study the catalysis of various substances by means of uranium salts in the sunlight. This paper is entirely of theoretic interest; but as it could be carried on without disadvantage, the results were published. The value of the study lies in the fact that it gives a means for the quantitative measurement of the effect of the tropical sunlight, as compared with that of temperate zones. Doctor Bacon also assisted the director in refuting some criticisms which had been made on work published by the latter while he was connected with the University of Michigan, and as a result an experimental paper on the action of sodium on acetone was prepared and published. Doctor Bacon has taken up the investigation of the gums, resins, and essential oils where Doctor Clover left it.

A study of the oils used in perfume, such as ylang-ylang, champaca, and sampaguita has been begun and some data are available. It is hoped that during the present season we can obtain the cooperation of manufacturers, so that the laboratory will be able to establish normals for these products, which will serve as a basis for valuation.

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THE SECTION OF WEIGHTS, MEASURES, AND MINERAL ANALYSES OF THE CHEMICAL LABORATORY.

Act No. 1519 of the Philippine Commission regulating the inspecting and sealing of weights and measures went into effect during the year, and as a result the actual work of standardizing has been begun. All of the weights, measures, and instruments of precision which have gone or are going to the provinces to serve as secondary standards have been compared, and the measuring flasks have been marked. The laboratories have received their fundamental standards from the International Bureau at Paris, and the instrument maker has built a comparator which is sufficiently accurate for all of our purposes.

It became evident during the past few years that the price which has been charged for assays, while it was a reasonable one in this country, was too high to make the assay work of practical value to the miners, and consequently a reduction in the schedule of charges was adopted. The present charge is a very low one, that is $1 United States currency for a gold assay, as it is scarcely sufficient to cover our expenses, unless very large lots are taken in at a time. However, it seemed extremely desirable in the interests of mineral development to give the miners an opportunity to have accurate and authoritative assays made at a practically nominal charge, especially as so much work of the laboratory is done without any remuneration. The result has been that, whereas for the previous year we had 233 assays to record, during the present one we have 621, and during the season of activity we have been somewhat overcrowded. As a rule very few samples are sent in during the rainy season.

The presence of the assay furnace in the main building became extremely objectionable, as a very good room which would be available for mineral analyses was sacrificed, and consequently a small house was built for assays away from the main building, and in that manner space for one more chemist was obtained. The assay building contains the ore crushers, grinders, and all other necessary machinery and the crucible and muffle furnaces. This improvement has made it possible for us to carry on modern assay work with great facility. The number of coal analyses and of calorific determinations has been very much augmented, owing to the increased interest in Philippine coals. There were 15 of these determinations made during the preceding year and 75 during the present one. These figures do not include the work done for the division of mines and for other bureaus of the government, or for the purposes of research. They simply represent the work done for private individuals for pay.

PHILIPPINE COALS.

Research work has been carried on as extensively as possible and a number of contributions from this section have appeared in the Philippine Journal of Science. Doctor Cox made extensive investigations of the coals of the Philippines, giving especial attention to their gas-producing power. All of these coals are noncoking and it probably would not be profitable to use them for ordinary gas making, where the coke is an important by-product, but they could be successfully employed in a producer-gas plant, which would save nearly the entire value. All of our experiments indicate that the most economical method for the consumption of Philippine coals would be as producer gas, and the results have been so promising that the bureau hopes to establish a trial plant in the near future, if funds for this plant are provided by the Commission. When it is in operation we can add very definite data to our present information. The empirical methods generally used for the analysis of coals are not applicable to those of the Philippines, owing to certain peculiarities of the latter. The analyses, as carried on by the official method, indicate our coals to be of a much poorer quality than is actually the case. As a result Doctor Cox was compelled to work out a method which gave satisfactory and reliable results and showed our coal to be comparable with the subbituminous coal of America and other places.

The laboratory has been equipped for actual steaming tests under the boiler, and it has endeavored to obtain Philippine coals from representative sources, but unfortunately the amount so available has been very limited, and from many places we have not been able to obtain any at all. Of course we have completed all tests of other coals available in the Manila markets for purposes of comparison, but it is feared that unless we can have brought to the bureau a greater variety of materials the publication of the actual steaming tests will be greatly delayed.

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The subject of Philippine coals is of the greatest importance. We suffer here from coal prices which to the commercial world are almost as serious as an epidemic of a contagious disease is to the multitude. Efforts in every direction should be made to advance the production and utilization of our Philippine deposits and to discover how much coal is available, and more especially what its quality is. I have heard Philippine coals condemned by persons who are utterly unaware of their nature or quality. It is true that in order to burn successfully many varieties will probably need a specially constructed fire box in the furnace, as the gas produced from this coal is so excessive as to cause great heat in the stack and loss in the fire box, but surely boilers and fire boxes can without great difficulty be so constructed as to take advantage of this condition, and certainly these coals can be used to great advantage in a producer furnace, by which means nearly all the combustible material will be made available. It is not good commercial practice to condemn a material simply on hearsay, but it is good commercial practice thoroughly to study and examine coal which is as plentiful as that in the Philippine Islands and to ascertain the best method for its utilization. A reduction in the price of coal would be an inestimable gain to the inhabitants of the islands. I believe that the government should foster coal development in every way within its power, and the building of the producer-gas plant would be one of the means by which this could be accomplished.

PHILIPPINE CLAYS.

Information relative to the quality and distribution of clays in the Philippines is being sought more and more frequently and therefore we have undertaken work in this direction, paying attention to possible cement materials. The difficulty which the chemical division labors under is that while many clays are brought in and found to be proper for use, our knowledge of the extent of the deposits, their area, cubical contents, etc., is most meager, and also, with the exception of a few places in Ilocos Norte, we have not as yet developed a knowledge of ample deposits of feldspar and quartz to assist in porcelain making. The mining division, owing to its reorganization, has a position vacant, and it is proposed to engage therein a man qualified especially for this work.

THE DIVISION OF MINES.

Mr. H. D. McCaskey, formerly chief of the bureau of mines, and afterwards chief of this division in the bureau of science, left for the United States on July 1. Mr. Eveland, after completing his work on the survey in Benguet, resigned on January 15 of this year, and Mr. McCaskey, without returning, also severed his connection with the bureau; consequently the work of the division of mines has been in a somewhat disorganized condition. Mr. Ickis was on vacation in the United States from August 2 to February 22, and as a result we had practically only one man in the field from July to September. Mr. Smith was engaged on petrographic work on the Benguet rocks and in the care of the fossil material, but during the month of September he was able to visit Ilocos Norte to investigate the reported asbestos and manganese deposits in that region. The results have been published in the Philippine Journal of Science. After October 1 and to December 5 Mr. Smith was not only writing up his material obtained in Ilocos Norte, but preparing for extended field work in Cebu, where much of the map work had previously been prepared by Messrs. Goodman and Ickis. On December 5 Mr. Smith took the field and began the large undertaking of geologic mapping of the coal regions of Compostela and Danao fields in Cebu. He was joined by Mr. Goodman in January, so as to facilitate the work on the map. Mr. Smith, upon his return from Cebu, was placed in temporary charge of the division and has continued as acting director up to the present time.

The extensive investigations into the geology of the coal regions of Cebu and the preparation of the map, as well as the working up of the materials which were then obtained, have occupied much of his time, but on April 21 he was able to accompany an expedition of the First Battalion of the Second Regiment of the United States Marines, Maj. E. H. Cole, commanding, from Olongapo to Mount Pinatubo, in Zambales Province. They returned to Manila on May 2. During this time he made a rapid reconnoissance of this unknown region and also did some work in the vicinity of Subig Bay. Mr. Ickis returned to Manila on February 22 and was at once dispatched to the Camarines to make a preliminary inspection of the gold region in the vicinity of Paracale and Mambulao. From there he went to the island of Polillo to inspect the coal workings, and

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thence overland from Infanta to Manila. The report is now being carefully prepared, as much material has been gathered. Preliminary suggestions in regard to this region were published in the mining number of the Far Eastern Review.

Mr. Henry G. Ferguson arrived in Manila on March 28 to take the place left vacant by Mr. Eveland, and for the first month after his arrival he assisted very largely in the petrographic work. On May 19 he was sent as a member of an expedition of scientists to the Batanes Islands, and subsequently he proceeded to the island of Camiguin, to the north of Aparri. The material gathered on this trip, which relates to a group of islands but little known, is being prepared for publication.

Mr. Goodman also made a rapid reconnoissance in the latter part of 1906 in the island of Marinduque, paying particular attention to the lead deposits reported to occur there. He was gone in the field about a month.

Owing to the disorganized condition of the division, to the separation of so many men, and to the fact that Mr. Ickis was on leave, no publication excepting a contribution to the physiography of Cebu Island, by W. D. Smith, was made, but since we have once more begun systematic work, press bulletin notices have been issued in each number of the Far Eastern Review, the division of mines having adopted this means of reaching the public with information of interest relating to mining subjects. These bulletins contain special announcements, short articles of commercial interest, discussion so far as is possible of nonmetallic minerals, and quotations and prices of chemicals and metals. The division has also cooperated in the editing of the mining edition of the Far Eastern Review and contributed four articles thereto.

ORGANIZATION OF THE DIVISION OF MINES.

It became evident that to obtain the best results a reorganization of the division was necessary, with a graded list of salaries so arranged as to give each one an opportunity for promotion. After the final adjustment the division will be as follows: A chief of the division in charge of geology; a mining engineer who shall have charge of the section of mineral resources; a mining engineer and topographer; a geologist who will take up petrography and ore deposits; an assistant geologist whose work shall be in nonmetallic minerals, such as clays, coals, etc.; and two field assistants. It is proposed in future to abandon the former policy of minute, detailed, and expensive surveys of particular regions which, while of great importance scientifically, do not cover a sufficient amount of territory actually to give us a reconnoissance of the geology of the Philippine Islands. To cover large areas in the minute way in which we began would take resources far greater than we can ever hope to command. Consequently the scope of the work for the future has been planned about as follows:

1. Geological reconnoissance work.
2. The investigation of economic materials, chiefly of fuels and materials for construction.
3. Statistical work.
4. Mapping.

It is proposed to bring the work before the public in the following series of publications:

(*a*) An annual bulletin on the mineral resources of the Philippine Archipelago, to be issued at the close of each calendar year. This bulletin will be statistical in character and we shall endeavor to gather from all mining sources the results obtained during the preceding year and the value of business done. It should serve as an exact index of the mining industry in the islands.

(*b*) Special geologic and geographic articles which have a scientific value and which will appear in the Philippine Journal of Science.

(*c*) A system of press bulletins, consisting of short articles and announcements of field work, will as heretofore be given out in the Far Eastern Review.

(*d*) It is also proposed, with each publication in the Journal, to issue separate sheets of the geologic and topographic maps, so that they shall be available to the miners.

PROPOSED NEW WORK.

When the work on the Cebu coal regions is completed, and the geologic map is now very nearly ready for the press, Mr. Smith will begin the reconnoissance work in Mindanao which we have long had in mind, while Mr. Ferguson

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and Mr. Ickis, with one assistant, will proceed to Bulalacao, in Mindoro, to study the coal fields of that region. Mr. Ickis and the assistant will execute the preliminary triangulation and run one or more level lines for control. Mr. Ferguson will fill in the topography with a plane table and later make an areal map of the geology. While waiting for Mr. Ferguson to be ready to proceed to Mindanao, Mr. Ickis will take the field in Masbate, where he will map approximately 40 square miles. He will then, after the work in Mindoro is completed, be joined by Mr. Ferguson and the assistant. The reconnoissance of Mindanao is planned to cover the Davao district, the district of Cagayan, that of Placer, the Agusan River, and Zamboanga. The party will consist of Mr. Smith, Mr. Goodman, possibly Mr. Ickis or Mr. Ferguson, and an assistant. The commanding general of the department of Mindanao has promised cooperation and assistance, together with the detail of men to make this expedition a success. The work will probably occupy five months. When the party returns three months at least will be needed to finish the report.

PUBLICATIONS OF THE DIVISION OF MINES.

The following articles are in press or completed for publication: Geography and Geology of the Baguio Mineral Region, with maps, by A. J. Eveland; Petrography of Some Benguet Rocks, by W. D. Smith; The Asbestos and Manganese Deposits and Related Geology of Ilocos Norte, Luzon, P. I., by W. D. Smith; The Compostela-Danao-Carmen Coal Fields of Cebu, P. I., with topographic, geologic maps, and relief models, by W. D. Smith and J. G. Gwastney; Contributions to the Physiography of the Philippine Islands: the Region of Mount Pinatubo, Zambales Province, P. I., by W. D. Smith; Geological Reconnoissance from Infanta to Laguna de Bay, Luzon, P. I., by H. M. Ickis.

NEEDS OF THE DIVISION.

The division has just passed through its reorganization and it is yet too early to expect the greatest results. However, it might be well here to mention some of the needs I have suggested in the preceding year. One necessity consists in more ample floor space. The geologic, paleontologic, and petrographic collections are growing, and with the field work planned, together with the method of rapid reconnoissance, these necessary adjuncts to geologic work will increase more rapidly in the future than in the past. There certainly should be here a well-organized collection typifying the mineral resources of the islands, and it is impossible to care for such a collection in the few rooms which can now be assigned to the division. The plan of the laboratory wing which has been prepared will make ample provision for necessary expansion, and it is hoped that before another year is completed we may be in a position to advance our collection rapidly. The library of the geologic, mineralogic, and petrographic section of the work has grown as rapidly as funds would permit, but, just as is the case with the work in fisheries, we are as yet but poorly equipped. Other divisions which began at the time of the organization of the bureau of government laboratories are therefore far ahead of the later additions, and much must be done in the way of giving the division of mines more ample library facilities.

The subject of topographic surveys has already been mentioned. The success of the division of mines depends upon this class of work, and we could cover very much more ground if we were able to rely upon completed topographic maps. However, as at the present time this is out of the question, the division must endeavor to do what it can. In the last appropriation bill there were given to the division of mines two positions for topographers. The opportunity to study on new geological work is so great that it might not be impossible to obtain two promising young men, just finishing their bachelor's course in the United States, as temporary assistants for one or more years. The salary would be enough to pay expenses, and what these graduates would learn would more than amply repay them for the time spent in coming here. Until we can discover whether this course is feasible, the two positions in question will be filled temporarily as field work requires.

It is hoped that within the next year the plans which have been outlined will have given encouraging results. Everyone realizes that we could do more with twice the staff and still more with three times the number of men, but our work in the field of mining and geology must be limited by the sums which the government can actually afford, and it is to the interest of every member

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of the division actively to push his work within the means allowed him and not to let his mind dwell on what might be possible were he confronted by different conditions. Active cooperation between the mining and chemical divisions is necessary, with full realization that research is for all who have the means and talent, and that no arbitrary line can be drawn where the functions of one division cease and those of the other began without seriously hampering work which is in the interest of the islands.

THE DIVISION OF ETHNOLOGY.

The division of ethnology of the bureau of education was transferred to the bureau of science on November 1, 1906. From the time of its beginning as the bureau of non-Christian tribes, this portion of the scientific work of the government has been moved from one place to another. In each instance a great loss of valuable material resulted. There was absolutely no space in the bureau of education for displaying what was on hand, and owing to the activity of the exposition board for the Louisiana Purchase Exposition, much material was gathered in the last few years which urgently needed attention and display. The method of storing the exhibits and the numerous transfers to which the glass cases had been subjected resulted in much destruction and breakage. It was consequently a great advance in the interests of this division when the bureau of science was able to secure the control of the entire upper floor of the building formerly occupied by the bureau of architecture. The length is approximately 150 feet and the width about 70 feet, the floor space being divided by half partitions. After this building had definitely been assigned to the bureau of science, contracts were let for its repair and for the construction of a number of glass cases and frames to display the exhibits. The moving was very much delayed and only completed at the time of writing, so that the work of the division in the immediate future must be the thorough overhauling, cleaning, and repairing of all exhibits and the placing of them in their future locations. It is intended to open this museum to the public, but obviously this can not be done until everything is in order. An inspection of the material on hand makes it evident that some money will need to be expended for the hire of mechanics to fit glass and to repair the exhibits which have become broken.

The ethnological work has suffered, owing to the fact that Dr. Merton L. Miller, its chief, was most seriously ill during the year and was finally compelled to leave for the United States for vacation and recuperation. He will return about the middle of October. During this interval the affairs of the division have been in charge of Mr. Christie, who has been at work on the material gathered during a trip to Mindanao, where he studied the customs, habits, and ethnology of the Subanos. The publication has not been completed, it having been delayed by the unfortunate surroundings of the division, and now Mr. Christie's time will need to be devoted to placing the exhibits in their proper order. The manuscript will be thoroughly edited and prepared for publication upon the return of Doctor Miller. Two other manuscripts have been submitted and are now in the hands of the printer. One an English-Igorot Vocabulary, by the Rev. W. C. Clapp, and the other on the Batan Dialect as a member of the Philippine Group of Malayan Languages, by Otto Scheerer. Both of these are important contributions to linguistic studies and they will be useful to travelers. It has therefore been decided not to publish them as numbers of the Philippine Journal of Science, but rather to issue them in the same form as the Journal and as separate publications at cost price. Another manuscript of Dr. Najeeb M. Saleeby on the history of the Moros is now in the hands of Doctor Miller for editorial reading.

With the aid of the division of mines, as good a map as is possible at the present time of Jolo and Mindanao has been prepared to accompany Doctor Saleeby's work, the second portion of which will relate to the Moros of Mindanao.

It is hoped that all the papers now in preparation will be published during the coming year, but necessarily they are all somewhat delayed owing to the absence of Doctor Miller.

In its present quarters, with its staff intact and with its increased facilities for caring for exhibits, the ethnological division should begin a new era, and we should steadily endeavor to increase our collection. If such collections are

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delayed too long the available material for them will rapidly diminish, and later great difficulty will be encountered in completing a picture of the wild tribes of the Philippine Islands as they at present exist. It will be the aim of the bureau to foster this division to as great an extent as its means will permit.

THE PHOTOGRAPHER.

The number of prints made during the last fiscal year was very much greater than in any similar preceding period, the total being well over 20,000. One class of work was undertaken for which there had previously not been much demand, for during the year we made 319 lantern slides. The photographer, Mr. Martin, made two expeditions, one to Mindanao, where he photographed a good series of Subanos, taking about five weeks, and another to Mayon, where he obtained collections from the volcano, having ascended the summit of the mountain during the expedition. The work of replacing the old negative envelopes, of cataloguing and classifying all negatives, and of completing the catalogue begun by the honorable the secretary of the interior occupied about six weeks toward the end of the fiscal year. In order to make the work at all possible four temporary employees were engaged, who spent all their time on our negatives. The result is that at the present time all the envelopes have been typewritten, the negatives have been classified and numbered, both in the regular album and catalogue, and only a few varied subjects remain to be adjusted.

THE POWER PLANT.

There have been no additions to or alterations in the power plant, the only change being in fitting up the boilers to make evaporation tests of fuels. During the latter part of the year we obtained from the bureau of forestry, by transfer, an impregnating apparatus for wood, which is sufficiently large to handle a railroad tie. The apparatus is now set up in the boiler room and prepared for operation. One difficulty lies in the fact that the cost of creosote in these islands is high.

The engineer during the year has prepared a plan for a producer-gas plant, which we hope to be able to erect in connection with our boilers, and in which we expect thoroughly to test our Philippine coals. The cold-storage room has been improved by additional insulation, and in that way we have very much cut down the expense. The workshop has completed quite a number of jobs, and much has been done in the way of repairing and keeping apparatus in order. A new universal milling machine has added much to the efficiency of the machine shop. We have during the year been able to employ two or three Filipino boys as student apprentices without pay. The results have been quite satisfactory. So far we have had six of these boys; two have found employment in other bureaus, one in the bureau of navigation, one with a commercial firm in Manila, and two remain as students in the shop. I am,

Very respectfully,

PAUL C. FREER,
Director of the Bureau of Science.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

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APPENDIX.

TABLE I.—*Comparative table of cash receipts.*

Cash sales.	Fiscal year 1906.	Fiscal year 1907.	1906 excess.	1907.
Cattle[a]	₱5,595.00	₱2,458.00	₱3,137.00	.....
Photograph	1,207.92	3,948.32	.....	₱2,740.40
Analysis	1,559.10	2,737.30	1,173.39	1,178.20
Examinations	1,927.09	753.70		.....
Assay	44.00	1,222.00		1,178.00
Vaccine virus	15,445.53	28,422.97	.....	12,977.44
Other serums	232.20	1,462.92	.....	1,230.72
Miscellaneous supplies	1,685.77	809.25	876.52	.....
Antirinderpest[b]	10,890.00	22,288.05	.....	11,398.05
Unclassified	.....	[c]4,314.95	.....	4,314.95
Total	38,586.61	68,417.46	5,186.91	35,017.76

Net increase over 1906, ₱29,830.85.

[a] No cattle sold after January 31, 1907, owing to transfer of rinderpest work to bureau of agriculture.

[b] After January 31, 1907, charge made only for preparing here.

[c] Property condemned and sold, ₱1,082.45; bird skins, ₱3,232.50.

TABLE II.—*Comparative table of free work performed by bpreau of science for insular bureaus during past three years.*[1]

JULY 1, 1907.

Department.	Fiscal year 1906.	Fiscal year 1907.	Excess fiscal year 1906.	Excess fiscal year 1907.
Health	₱134,087.36	₱60,221.00	₱73,866.36	.....
Civil hospital	10,765.00	9,001.00	1,764.00	.....
Customs	592.41	927.00	.....	₱334.59
Supply	490.00	815.00	.....	325.00
Agriculture	3,996.08	520.00	3,476.08	.....
Prisons	23,750.00	24,683.00	.....	933.00
Constabulary	320.00	146.00	174.00	.....
St. Luke's dispensary	71.00	83.00	.....	12.00
Public works	363.90	470.00	.....	106.10
Education	91.08	120.00	.....	28.92
Treasury	9.00	.....	9.00	.....
Printing	95.00	285.00	.....	190.00
Internal revenue	20.00	281.00	.....	261.00
Secretary of interior	30.00	10.00	20.00	.....
Forestry	51.56	221.50	.....	169.94
Public Health and Marine-Hospital Service	105.00	6.00	99.00	.....
Navigation	2.20	10.00	.....	7.80
Coast and geodetic survey	14.92	9.00	5.92	.....
Ethnological survey	173.19	.....	173.19	.....
Weather bureau	2.88	.....	2.88	.....
Indigent patients	6.00	.....	6.00	.....
Cold storage	26.64	.....	26.64	.....
Mining	176.58	.....	176.58	.....
Total	175,2398.0	97,808.50	79,799.50	2,368.35

Net decrease 1907, ₱77,431.30.

[1] 40,000 rats examined in 1906 and prices of vaccine virus reduced from ₱0.03 to ₱0.01 after November 1, 1906, all of which does not appear hereon (cash sales).

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TABLE III.—*Financial statement, July 1, 1906, to June 30, 1907, fiscal year 1907.*

Subject.	Appropriation.	Expended.	Overdrawn.	Balance.
Transportation	₱8,000.00	₱8,046.74	₱46.74	.....
Chemicals, apparatus, and supplies	20,000.00	21,486.11	1,486.11	.....
Small animals	2,000.00	3,130.13	1,130.13	.....
Feed for small animals	800.00	2,342.19	1,542.19	.....
Telephones	526.00	338.79	.....	₱187.21
Ice and distilled water	1,638.00	1,115.55	.....	522.45
Office supplies	1,500.00	2,485.79	985.79	.....
Herbarium cases	350.00	396.00	46.00	.....
Photographic supplies	2,500.00	3,987.87	1,487.87	.....
Cablegrams	375.00	580.76	205.76	.....
Telegrams	600.00	162.60	.....	437.40
Repairs to apparatus, furniture, etc	2,250.00	1,542.52	.....	707.48
Post-office box	32.00	32.00	.....	.....
Mounting botanical specimens	200.00	.....	.....	200.00
Eggs, meat, milk, etc	150.00	110.45	.....	39.55
Postage	4,000.00	1,813.85	.....	2,186.15
Laundry	160.00	382.79	222.79	.....
Alcohol	1,000.00	679.89	.....	320.11
Coal, oil, and maintenance of apparatus	10,000.00	10,479.72	479.72	.....
Printing and binding	20,000.00	20,613.08	613.08	.....
Books and subscriptions	6,643.00	11,573.72	4,930.72	.....
Horses, cattle, etc	7,900.00	12,184.49	4,284.49	.....
Feed for large animals	13,400.00	13,304.22	.....	95.78
Maintenance of city transportation	3,100.00	2,084.71	.....	1,015.29
Rental of fire-alarm boxes	108.00	108.00	.....	.....
Window awnings	60.00	13.20	.....	46.80
Division of ethnology	9,500.53	a 7,000.00	.....	2,500.53
Philippine medical school	.....	329.00	329.00	.....
Total contingent	116,729.53	126,324.17	17,790.28	8,258.75
Reimbursement, traveling expense and half salary	15,000.00	27,855.16	12,855.16	.....
Salaries and wages	202,708.00	184,008.71	.....	18,699.29
Division of ethnology	7,137.99	.....	.....	7,137.99
Total salaries	224,845.99	211,863.87	12,885.16	25,837.28
Emergency, 1906 } Obligations }	1,402.30	.....	.....	1,402.30
Balance platinum, still available	231.17	.....	.....	231.17
Grand total	343,271.99	338,188.04	30,645.55	35,729.50
Balance to revert to treasury	.....	5,083.95	5,083.95	.....
	343,271.99	343,271.99	35,729.50	35,729.50

a Repairs to Anloague building.

TABLE IV.—*Comparative table of serums and other preparations made and disposed of during the fiscal years 1906 and 1907.*

JULY 1, 1907.

	1906.	1907.	Excess.	
			1906.	1907.
Vaccine virus:	*Units.*	*Units.*	*Units.*	*Units.*
Prepared	2,250,505	2,804,042	.....	553,537
Disposed of	2,316,785	2,846,687	.....	529,902
Antirinderpest:				
Prepared	1,712,775	947,800	764,975	.....
Disposed of	1,324,225	1,376,550	.....	52,325
Plague prophylactic:				
Prepared	.....	.....	.....	.....
Disposed of	790	.....	790	.....
Mallein:				
Prepared	699	837	.....	138
Disposed of	1,976	830	1,146	.....
Diphtheria antitoxin:				
Prepared	210,000	.....	210,000	.....
Disposed of	23,000	69,500	.....	46,500
Tetanus antitoxin:				
Prepared	951,233	4,160,927	.....	3,209,694
Disposed of	70,988	1,811,172	.....	1,740,184
Cholera vaccine:				
Prepared	15,330	1,710	13,620	.....
Disposed of	10,140	1,650	8,490	.....
Antiplague serums:				
Prepared	4,620	205	4,415	.....
Disposed of	120	30	90	.....

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TABLE V.—*Comparative table of routine work performed by the bureau of science during the past two fiscal years.*

JULY 1, 1907.

	1906.	1907.	Excess.	
			1906.	1907.
CHEMICAL DIVISION.				
Oils, paints, pigments, etc.[a]		41		41
Clays, soils, fertilizers, cement [a]		24		24
Fuels, coals, wood, gas, petroleum [a]		30		30
Rocks and minerals [a]		6		6
Metals and alloys [a]		3		3
Food, alcohols, and beverages [a]		285		285
Water	43	113		70
Urines, clinical and toxicological analysis [a]	801	1,033		232
Miscellaneous	505	760		255
Total	1,349	2,295		946
Assays	233	621		388
Sets weight and measures standardization [a]		148		148
Total	1,582	3,064		1,482
BIOLOGICAL DIVISION.				
Feces [b]	3,940	6,300		2,360
Sputum [c]	4,385	1,682	2,703	
Blood	1,499	2,377		878
Gonococci	15,705	14,169	1,536	
Water	401	150	251	
Miscellaneous [a]	42,455	1,521	40,934	
Necropsy	395	250	145	
Total	68,780	26,449	45,569	3,238
Shopwork	116	131		15
Miscellaneous division, various works		3		3
Grand total	70,478	26,647	45,569	4,738
Photographs, 5 by 7	8,658	18,355		9,697
Photographs, 8 by 10	384	244	140	
Photographs, 4 by 5		56		56

[a] Included in miscellaneous, chemical division, in 1906; 40,000 plague-rat examinations, 1906, and toxicological analysis for 1906.
[b] Increased work at Bilibid on account of Doctor Garrison's work.
[c] Only necessary examinations made at Bilibid after October, 31, 1906, instead of regular monthly examinations of all patients; net decrease examinations, 41,147.

TABLE VI.—*Statement of the value of work performed free of charge for the fiscal year 1907.*

	July.	August.	September.	October.	November.	December.
Bureau of health	₱5,077.00	₱5,666.00	₱3,849.00	₱4,486.00	₱4,133.00	₱4,111.00
Civil hospital	1,263.00	1,139.00	633.00	982.00	972.00	643.00
Bureau of customs	25.00	30.00	70.00	41.00	169.50	83.00
Bureau of supply	40.00		25.00	73.00	24.00	415.50
Bureau of agriculture	68.00		10.00	12.00		45.00
Bureau of prisons	1,361.00	3,247.00	945.00	1,575.00	1,768.00	1,794.00
Bureau of constabulary				3.00	59.00	
St. Lukes dispensary	10.00		9.00	12.00	3.00	3.00
Bureau of public works		10.00				
Bureau of education		15.00				105.00
Bureau of treasury						
Bureau of printing	35.00		20.00	30.00	80.00	20.00
Bureau of internal revenue		55.00	81.00	82.50		40.00
Secretary of the interior	10.00					
Public health and marine-hospital service					3.00	3.00
Bureau of forestry				40.00	100.00	20.00
Bureau of navigation					10.00	
Coast and geodetic survey						
Total	7,889.00	10,162.00	5,642.00	7,336.50	7,321.50	7,282.50

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TABLE VI.—*Statement of the value of work performed free of charge for the fiscal year 1907*—Continued.

	January.	February.	March.	April.	May.	June.	Total.
Bureau of health	₱5,480.00	₱3,585.00	₱4,252.00	₱4,192.00	₱6,311.00	₱9,079.00	₱60,221.00
Civil hospital	840.00	698.00	657.00	504.00	432.00	238.00	9,001.00
Bureau of customs	78.00	49.00	58.00	176.00	40.00	107.50	927.00
Bureau of supply	79.00	9.00	.....	90.00	30.00	29.50	815.00
Bureau of agriculture	.....	43.00	273.00	45.00	11.00	13.00	520.00
Bureau of prisons	2,279.00	1,760.00	2,897.00	2,480.00	2,247.00	2,230.00	24,583.00
Bureau of constabulary	6.00	.....	3.00	.....	.....	75.00	146.00
St. Lukes dispensary	16.00	.....	.....	30.00	.....	.....	83.00
Bureau of public works	180.00	.....	40.00	115.00	120.00	5.00	470.00
Bureau of education	.....	.....	.....	.....	.....	.....	120.00
Bureau of treasury	.....	.....	.....	.....	.....	.....	.....
Bureau of printing	.....	.....	.....	20.00	70.00	10.00	285.00
Bureau of internal revenue	7.50	.....	.....	7.50	7.50	.....	281.00
Secretary of the interior	.....	.....	.....	.....	.....	.....	10.00
Public health and marine-hospital service	.....	.....	.....	.....	.....	.....	6.00
Bureau of forestry	56.50	.....	.....	.....	.....	5.00	221.50
Bureau of navigation	.....	.....	.....	.....	.....	.....	10.00
Coast and geodetic survey	9.00	.....	.....	.....	.....	.....	9.00
Total	9,031.00	6,144.00	8,180.00	7,659.50	9,268.50	11,792.00	97,708.50

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APPENDIX E.

REPORT OF THE DIRECTOR OF LANDS.

DEPARTMENT OF THE INTERIOR, DIRECTOR OF LANDS,
Manila, P. I., August 5, 1907.

SIR: I have the honor to submit the annual report of the bureau of lands for the fiscal year ended June 30, 1907. During the year the work of the bureau has materially increased in every department, but the organization outlined in the last report has been maintained and found efficient. The personnel of the bureau has increased from 316 to 637 employees, and yet it is found impossible to keep up the current work, either in the public lands or the surveying division. The personnel has become more permanent during the year and greater efficiency has been obtained. It has been found that the salaries authorized for the chiefs of division, ₱4,000 per annum, were fixed too low to retain in the service the character of men required. It is therefore proposed to increase the salaries of these positions to ₱5,000 per annum in order to attract and hold capable men, as constant changes in the positions of chiefs of division are detrimental to the service, not only causing delay in the business of the division, but also increasing the expenses thereof for the work done.

The 92 employees who are in the classified service and entitled to accrued and vacation leave have earned during the year, under the law for vacation leave, 1,936 days, aggregating ₱13,820.42, while these employees have received leave to the extent of 1,374 days, aggregating ₱8,251.06, leaving 562 days' vacation leave, aggregating ₱5,569.36, earned but not taken. Under the laws governing accrued leave these same employees have earned 2,170 days, aggregating ₱15,867.53, and have received 619 days, aggregating ₱5,489.44, leaving liabilities to the bureau to the extent of 1,551 days, aggregating ₱10,378.09. Seventy per cent of the vacation leave due and 29½ per cent of the accrued leave earned by employees was taken. As the personnel is comparatively new, the liability of the bureau on account of accrued leave will, for at least two years longer, be comparatively large, but during the next year employees who have been for three or more years in the service will begin to take their accrued leave, which will materially increase the expenses for salaries and wages, as such a condition necessitates the employment of extra employees to perform the work of those absent on leave.

While the quarters on the third floor of the Oriente building have been found adequate, the increase in the force for the coming year will necessitate the addition of at least two rooms; and as several on the same floor have been vacant during the past year, it is anticipated that they will be assigned to this bureau.

The lack of proper vault space in the building for the safe-keeping of land documents and records of surveys was the cause of the request to the bureau of public works for the preparation of plans and estimates for a vault, to be submitted to the consideration of the Philippine Commission, and it is urgently recommended that an appropriation be made for this purpose, as the loss of the records of survey would necessitate resurveys costing hundreds of thousands of pesos.

There are stated hereafter, under the different natural subdivisions of the work, an account of work accomplished during the year, recommendations relative thereto, and a statement of the finances of the bureau, subdivided as follows: Friar lands, public lands, surveying and drafting, San Lazaro estate, and financial statement.[a]

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[a] Financial statement has been omitted and filed in the Bureau of Insular Affairs, War Department.

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FRIAR LANDS.

The organization effected during the fiscal year 1906 for the administration of the friar lands has been found sufficient, and no material changes have been made during the year. An experiment was made by replacing an American agent on one of the estates by a Filipino who came to the bureau well recommended. After some months, during which nothing was accomplished on this estate except a reduction of the cost of administration, the agent was found, by the auditor's examiner, to have committed certain irregularities through negligence or ignorance, and therefore it became necessary to discharge him from the service. As a result of this experience and the irregularities of a minor nature committed by native clerks, the conclusion has been reached that it would be unwise to make further attempts in this direction, except by the use of native employees who have had the benefit of a long course of training in the friar land offices, shown marked ability and activity in the work, and whose integrity and honesty have been established beyond question.

The work of the administration of these estates has been hampered and the progress and welfare of the tenants materially retarded by political agitation conducted by those seeking the advancement of their own interest. The prejudices of the people and the arguments which were heretofore used to incite people to insurrection have been used by politicians. A topic which has never failed to secure the attention and hold the interest has been the assurance that the coming assembly would deliver over the friar lands to the occupants, the rightful owners of the same, free of all cost. Such assurances caused tenants to withhold their rents or delay making formal leases with the government. Still more incredible, but nevertheless a fact, tenants have been led to believe on some estates that a war between the United States and Japan was imminent, that the Japanese would take possession of the islands, and that if the payment of rent was delayed it might be evaded altogether. Aside from this is the continual agitation for the reduction of the rates of rental and exemption from payments of rents on nonproductive lands, and other similar questions which have formed live issues during the political campaign now coming to a close. But notwithstanding the retarding of the work by political agitation, considerable progress has been made.

It may be stated that the major portion of all estates devoted to rice culture is now occupied and leased, but that portion formerly devoted to the cultivation of sugar is practically abandoned, owing to the following conditions: (1) The lands are covered with stands of madre cacao or cogon grass of more than ten years' growth, which would necessitate an expenditure of from 20 to 100 pesos per hectare for clearing; (2) the former occupants have not even enough animals to cultivate their rice holdings, and therefore can not begin work on sugar lands; (3) mills, warehouses, machinery, and employees' houses were burned or are in such a state of repair that the owners can not, in the present condition of their finances, place them in condition for use; (4) agriculturists have not sufficient funds wherewith to plant and cultivate the sugar crop and are unable to borrow except at excessive rates of interest. Some of these conditions this bureau is endeavoring to rectify, as will be shown herein.

Many difficulties have been encountered in the administration of the friar lands estates through the decisions of the justices of the peace where there have been questions relative to the actual, bona-fide occupants in possession of said lands at the date of purchase by the Government. These matters have now reached such a critical stage that it is deemed of sufficient importance to take the questions up in a special report, as the cases are fast accumulating where apparent injustice has been done to the poorer class of occupants who are unable to appeal their cases to the higher courts.

All the friar estates have now been registered under the mortgage law in the respective provinces where located. San José estate has been registered under the Torrens act and a certificate issued therefor. Matamo, San Marcos, and Dampol estates are now before the court of land registration pending the action of the court, and other estates will be entered as fast as the surveys are completed and the information at hand with which the attorneys can file application for registration.

The following statement shows the progress on each estate, the current expenses, the receipts, and nonrecurrent expenses during the year, with a statement showing the deficit which has resulted to June 30, 1907:

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STATEMENT SHOWING PROGRESS OF FRIAR LAND ESTATES DURING FISCAL YEAR 1907.

Name of estate.	Percentage of area to June 30, 1907.				Leases June 30, 1907.			
	Area purchased.	Estimated occupied.	Surveyed.	Leased one-year leases.	Number.	Area covered.	Annual rental contracted for.	Receipts, fiscal year 1907.
	Hectares.					*Hectares.*		
Banilad	1,925	70	100.0	37.7	736	727	₱4,093.12	₱4,003.30
Binagbag	295	60	100.0	58.5	198	172	735.20	718.96
Bifian	3,659	60	100.0	57.0	1,851	2,086	20,041.04	19,044.66
Calamba	13,673	25	49.5	15.0	1,448	2,053	17,322.18	16,878.08
Dampol	929	100	100.0	100.0	311	929	4,222.04	4,081.68
Guiguinto	946	90	100.0	89.4	440	845	5,865.84	5,799.70
Imus	18,243	30	53.7	24.4	3,548	4,446	27,357.46	29,905.86
Isabela	19,891	1	100,0	0.5	60	79	596.12	1,641.10
Lolomboy	5,178	60	68.3	40.0	1,886	2,076	13,639.53	16,614.17
Malinta	3,574	70	100.0	61.3	961	2,192	12,576.42	11,146.28
Matamo	12	100	100.0	100.0	1	12	68.00	68.00
Muntinlupa	2,827	50	59.9	46.4	429	1,313	2,901.22	923.09
Naic	7,624	40	47.9	35.8	1,141	2,732	24,525.86	22,243.28
Orion	916	80	100.0	74.0	405	680	4,885.68	4,344.30
Piedad	3,860	25	None.	23.3	423	901	4,823.46	4,592.34
San Francisco de Malabon	11,449	40	52.8	27.9	1,528	3,197	23,767.32	10,489.07
San José	23,266	None.	100.0	None.	None.	Cattle range.	2,000.00	2,340.00
San Marcos	87	100	100.0	100.0	1	87	349.68	174.84
Santa Cruz de Malabon	9,795	20	Begun.	15.9	963	1,556	11,346.40	10,939.38
Santa Maria de Pandi	10,342	50	28.3	38.2	2,128	3,954	21,125.43	25,389.77
Santa Rosa	5,470	70	100.0	67.0	1,356	3,668	26,140.02	22,400.11
Tala	6,696	29	None.	8.0	350	537	3,151.04	2,885.66
Talisay	8,020	80	None.	19.8	2,065	1,590	10,404.18	10,054.00
Twenty-three estates	158,677	32	60.1	22.6	22,229	35,832	241,937.24	226,627.63

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STATEMENT SHOWING PROGRESS OF FRIAR LAND ESTATES DURING FISCAL YEAR 1907—Continued.

Name of estate.	Annual interest on purchase price at 4 per cent.	Expenses fiscal year 1907.			Deficit fiscal year 1907.	Extraordinary nonrecurrent expenses, fiscal year 1907.		
		Account expenses administration.	Account expenses irrigation.	Total current expenses.		Account surveying.	Account irrigation.	Total.
Banilad	₱8,479.98	₱1,404.43	.....	₱9,884.41	₱5,881.11	₱11,886.82	.....	₱11,886.82
Binagbag	1,434.91	596.83	.....	2,031.74	1,312.78	2,638.70	.....	2,638.70
Biñan	24,063.33	3,748.66	₱3,149.24	30,961.23	11,916.57	10,311.81	.....	10,311.81
Calamba	55,417.73	8 706.78	1,620.75	65,745.26	48,867.18	19,962.20	.....	19,962.20
Dampol	6,025.90	990.17	.....	7,016.07	2,984.39	1,834.21	.....	1,834.21
Guiguinto	6.222.72	1,404.12	.....	7,626.84	1,827.14	1.296.42	.....	1,296.42
Imus	82,880.97	11,569.35	4,005.15	98,455.47	68,549.61	22,958.60	.....	22,958.60
Isabela	12,788.64	3,205.26	.....	15,993.90	14,352.80	10,349.35	.....	10,349.35
Lolomboy	38,929.65	5,137.23	49.60	44,116.48	27,502.31	18,828.46	.....	18,828.46
Malinta	17,616.85	3,247.90	.....	20,864.75	9,718.47	18,783.31	.....	18,783.31
Matamo	67.29	77.29	.....	144.58	76.58	84.56	.....	84.56
Muntinlupa	3,507.08	649.43	346.70	4,503.21	3,580.12	5,705.08	.....	5,705.08
Naic	39.308.46	7,626.57	1,268.12	48,203.15	25,959.87	13,606.92	.....	13.606.92
Orion	3,922.01	1,264.08	.....	5,186.09	841.79	6,489.89	.....	6,489.89
Piedad	13,213.74	2,434.75	.....	15,648.49	11,056.15	589.73	.....	589.73
San Francisco de Malabon	42,794.99	5,836.24	1,488.87	50,120.10	39,631.03	19,025.77	₱6,996.18	26,021.95
San José	23,902.57	1,857.52	.....	25,760.09	23,420.09	948.42	.....	948.42
San Marcos	492.99	77.25	.....	570.24	395.40	156.27	.....	156.27
Santa Cruz de Malabon	41,496.50	5,565.30	2,774.53	49,836.33	38,896.95	2,469.11	6,721.64	9,190.75
Santa María de Pandi	42,185.49	5,534.68	.....	47,720.17	22,330.40	16,294.08	144.14	16,438.22
Santa Rosa	36,409.39	5,630.67	2,323.71	44,363.77	21,963.66	19,975.09	.....	19,975.09
Tala	8,964.35	1,671.19	.....	10,635.54	7,749.88	351.65	.....	351.65
Talisay	44,311.48	7,384.39	.....	51,695.87	41,641.87	1,942.73	.....	1,942.73
Twenty-three estates	554,437.02	85,620.09	17,026.67	657,083.78	430,456.15	206,489.18	13,861.96	220,351.14

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Comparison of the above statement with the statement submitted in the last annual report shows an increase of 3,459 leases, covering an area of 6,207 hectares, with an increased contracted rental of ₱36,051.77, and increased revenues for the year of ₱127,966.33, while the cost of administration during the year was ₱85,620.09, and shows an increase of ₱1,964.79 over the same expense for the fiscal year 1906. The expenses on account of irrigation, however, show an increase of ₱11,006.52 over those for the year 1906, due to the employment of ditch tenders and laborers throughout the year for the maintenance of the irrigation systems. The expenses of surveying during the year were ₱206,489.18, as against ₱83,564.63 during the previous fiscal year, caused by the fact that more surveyors were employed in order that the surveys might be completed as soon as possible, in accordance with the desire of the Philippine Commission. The repairs on certain irrigation works on these estates resulted in an expense of ₱13,861.96. It is probable that during the coming fiscal year the expense of administration may be somewhat reduced, while that of irrigation will remain practically the same. The extraordinary or nonrecurrent expenses for surveying and drafting will be increased during the year, but it is expected to terminate the work of surveying at the end of the fiscal year.

In the last annual report mention was made of a certain lot situated in the town of Santa Rosa, which the Philippine Sugar Estates Development Company (Limited) claimed had been sold to Mr. A. Kauffman during the month of July, 1903, and was not excluded either in the preliminary contract or the deed of sale of the Santa Rosa estate. The proposition made by this bureau relative to this lot was not accepted by the company, which finally acknowledged that the proposed sale to Mr. Kauffman had not been carried out with all the legal formalities usual in the transfer of real estate, and withdrew all of its claims to this piece of property.

The controversy over the lot adjoining the casa-hacienda, fronting on the plaza in the town of Santa Rosa, has not yet been disposed of. The matter was referred to the attorneys for the government for investigation and report, and it was their opinion that the contention of the municipal authorities was substantiated by the facts. As a consequence of this report the Philippine Sugar Estates Development Company (Limited) was notified that this plot of ground was considered a portion of the lands conveyed to the government and must be excluded from the tract reserved by the company, and until such exclusion was made no survey of their tract would be approved by this bureau. To this notification the company replied that it reserved the right to take the matter before higher competent authorities. Here the matter has rested for many months, the municipality in the meantime using such portions of the land as it deemed necessary. This bureau has undertaken a compromise in this matter which it is hoped to reach in the near future, as the company has evinced a disposition to modify its demands, and now seems willing to take only that portion directly in front of the main entrance to the casa-hacienda.

In relation to the Calamba machinery case, mention of which was made in the last annual report as having been referred to the attorneys for the government for action, it is understood that an attempt was made to reach a settlement, but without success. On October 13, 1906, a suit was filed in the court of first instance of Manila against the company, seeking the recovery of ₱50,000 as liquidated damages for the removal of the six sugar mills in controversy. Hearing in this case has not been had, but it is anticipated that the matter will be brought to trial during the next few months. The contention of the government is based upon the fact that these mills were specifically mentioned in the negotiations held just prior to the execution of the preliminary contract covering this estate, and further, that the said mills were not specifically excluded in the deed of sale executed in favor of the government, as was done in the case of other estates where lands or improvements were reserved for the company. The contention of the company will, in all probability, be that these mills were excluded by mutual understanding and agreement from both the contract and the deed of sale, and they will exhibit rough, typewritten drafts of such instruments, with certain words crossed out, in support of such contention. However, while this may seem plausible, it does not explain the circumstances of bringing these improvements into consideration when the value of the estate was under discussion, and the failure to expressly exclude this machinery in the deed of this estate as in other cases, particularly in view of the facts that these mills were never located on lots reserved by the company.

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No change in the status of the Malinta land claims, wherein Maria Serrano and others claim portions of the Malinta estate, has occurred. However, it is expected shortly to make application for registration of the Malinta estate before the court of land registration, the survey having been completed, and naturally these cases will be brought up during the hearing for the registration of this property.

During the year past one Eulalia Bagtas has filed with the court of land registration application for the registration of a tract of land situated in the Orion estate in the Province of Bataan. An investigation demonstrated that this land lay wholly within the estate and immediately upon the notification of these facts the case was referred to the attorneys for the government and a request made to enter opposition, which was accordingly done. Thereafter the case was set for hearing, but before the day of the trial the applicant filed a motion for postponement, acquiesced in by the government's attorneys. Apparently the attorneys for the applicant deemed it advisable to desist, since no new date for hearing has been announced, notwithstanding that it has been several months since the date first set for trial, and the attorneys for the government have advised this bureau to allow the matter to rest until such time as application is made for registration of this estate before the court of land registration.

TEMPORARY LEASES.

As explained in the last annual report, in executing temporary leases the object was primarily to secure an acknowledgment of title by the occupants, by reason of a lack of data it became necessary to accept the statement of each prospective lessee, not only as to the number of parcels by him occupied but also as to the area of such parcels. Temporary leases have been executed for a period of but one year on the basis mentioned above, and whenever the survey has progressed to such an extent as to admit of so doing the old leases have been recalled and others executed in place thereof. In many instances it has not been possible, even after the field work of the surveyor has been completed, to secure the exact areas, but computations of them have been made with the planometer which are within 5 per cent of the exact area, and they have been used in the execution of the new leases. By this method it has been possible to make an improved showing in the leased area on several of the estates, and during the coming year much progress should be made along these lines and the exact areas of a number of the estates should be known. Great difficulty has been experienced in securing the execution of the new leases in lieu of the old, owing to the fact that in almost every instance an increase in area has been called for and a corresponding increase in the annual rental has resulted. In many cases the new areas have been double those originally declared, and the report has been freely circulated that the bureau has increased the rates of rental. This report has been generally believed by the more ignorant, and by many who should know otherwise. This charge of increase in rental has been made by tenants who in reality are well informed to the contrary, and who have charged that the surveys were inaccurate, but when they were brought face to face with the facts have grudgingly admitted that the surveys might possibly be exact, but, as they did not cultivate a certain portion of their land, they should not, therefore, be required to pay rent therefor. Naturally it is wasted effort to endeavor to convince one who knows the truth but is determined to evade the same on some pretext or other, and gathers a following and gives importance to his complaints by circulating false reports among the less enlightened for the purpose of gaining support and adherence. A concrete example of the foregoing general statement is furnished in the San Francisco de Malabon estate, where there are a large number of lessees who, for the last twelve months, have steadfastly refused to execute new leases by reason of the increase in area and rentals. An offer was made by this bureau to endeavor to obtain an extension of the period in which they could pay their rentals on lands leased but not cultivated, which has since received the sanction of the secretary of the interior, but up to date none of the tenants have endeavored to take advantage of this offer, and unless they adopt a different attitude in the immediate future and evince some disposition to comply with their obligations, this bureau will have no other recourse than to begin suits for ejection from the premises. It is not the holders of the smaller tracts of land who have thus refused to re-lease, but, as a rule, those holding large areas and a large portion of the cultivable land, and who work the same only on shares. It was believed a year ago that the issuance of permanent leases might be dispensed with entirely on most of the estates, and that the bureau could proceed immediately

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to the issuance of sales certificates. Events of the last year, nowever, raised serious doubts as to whether it will be feasible so to do. In certain instances, where it was proposed to commence the issuance of sales certificates as a preliminary thereto, notice was issued that all rentals must be paid to a given date, but the tenants so strongly objected to the enforcement of this demand and have laid such stress on their impoverished condition and the hardship which would be imposed upon them by such action, which facts they have in a measure substantiated, that it was deemed advisable not to attempt to proceed with the sale at that time as such proceedings seemed but to invite failure.

In view of the fact that the total contracted rental in most instances does not equal the amount of annual interest accruing on the purchase value of any estate, that the payment of even this reduced sum is considered in the light of a hardship, and that in the event of the issuance of sales certificates not only would one-tenth of the full value of the land become due and payable annually, but in addition thereto 4 per cent on deferred payments, which would amount to more than is to-day paid as rental for the land, the advisability of disposing of other than small town and barrio lots and small tracts of agricultural lands of insignificant areas is a matter of considerable speculation and uncertainty. Patience is no doubt put to a serious trial when a tenant will insist on immediate sale to him of the land he occupies and, in the same breath, lament his inability to pay the exorbitant rentals now asked, yet these are the pretensions of not a few, among whom are generally the most influential people of the several communities.

It is my opinion that it will be absolutely impossible, except on a few of the smaller estates, to carry out the provisions of act No. 1120, by selling parcels of land on these estates on the basis of ten annual payments, with interest at 4 per cent per annum on deferred payments, as such a contract with the occupant means that he will have to pay from four to six times the amount he is now paying as rent. It is therefore urgently recommended that an amendment to act No. 1120 be enacted extending the time of payment to thirty years, which, under the provisions of the act, will permit this bureau to make contracts with tenants to suit their finances, thirty years to be the maximum time for payment for any parcel of land, deferred payments to bear interest at the same rate as now provided, 4 per cent per annum. While this increases the total interest to be paid by the tenant, it gives him an opportunity to reduce his annual payment to an amount that, with his resources from the sale of the crops from his land, he should be able to meet. Even on this basis the annual payment per hectare will average almost double the annual rent now charged per hectare. Thus, an occupant purchasing a hectare of ground, the value of which is ₱150, would be compelled to pay ₱5 per annum capital, plus the interest for the first year on the deferred payment, ₱5.80, or a total of ₱10.80, whereas the same occupant is now paying in no case to exceed ₱10, and in many cases not to exceed ₱4.

An attempt has been made to estimate the approximate amounts of readily salable land on each estate; with the following results (stated in percentages of areas): San José and Isabela estates (practically unoccupied), none; Tala estate, 50; Calamba estate, 60; Naic, San Francisco de Malabon, Imus and Santa Cruz de Malabon estates, 70; Piedad estate, 75; Binagbag, Banilad, Talisay and Pandi estates, 80; Orion, Malinta, and Lolomboy estates, 90; Biñan and Santa Rosa estates, 95, and Matamo, San Marcos, Dampol, Guiguinto, and Muntinlupa estates, 100 per cent.

The sale value of all the estates, excluding the improvements—irrigation systems and the buildings—aggregated June 30, 1907, ₱14,337,400, while the estimate of the aggregate values of the salable land on the same date was ₱10,239,500, indicating that there are approximately ₱4,000,000 invested in land, and ₱1,000,000—the estimated value of the irrigation system and other improvements—in improvements, which, for some time to come, will neither be sold nor produce any great amount of revenue, but which annually costs at least ₱200,000 as interest on the bonds issued.

THE EXTENSION OF THE CULTIVATED AREAS ON ESTATES.

While the cultivated areas on the occupied estates are being continually increased, the process is a very slow one, owing to the lack of capital of the occupant for the purchase of draft animals, seed, farming implements, and machinery, and I believe that, under ordinary conditions, as a conservative estimate, ten years must elapse before as great an area of these estates is put under cultivation as was cultivated prior to the insurrection—say, in 1895.

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Some extraordinary stimulus is necessary in order to obtain an extension of the cultivated areas on friar estates, especially on those estates where formerly sugar cane was cultivated to a large extent, the estates located in Cavite and Laguna provinces, where it is estimated there were from 20 to 25,000 hectares producing sugar cane under the friars' administration. This bureau having this condition under consideration, recommended to the secretary of the interior, for the purpose of extending the areas under cultivation, a scheme for the loan to bona fide tenants of funds for the purpose of cultivating their lands, and a committee, consisting of the insular auditor, the director of agriculture, and the director of lands, was directed by resolution of the Philippine Commission to prepare such an act and submit their recommendations thereon, which were favorable. The matter was referred to the attorney-general, who saw no legal objection to the investment of the surplus fund or the sinking fund pertaining to friar lands in mortgages covering growing crops and salable commodities manufactured therefrom, work animals, warehouses, mill houses, and machinery, and other property, both real and personal, situated upon the so-called friar estates. This act provided that the maximum amount advanced on growing crops should not exceed ₱100 per hectare, and regulations were prepared which would limit the advancement of this ₱100 as the work in the cultivation of the crops proceeded. For instance, on the sugar crop, it was proposed to make advances as follows:

Clearing of the land, fuel for the plow, transportation of water for the plow, and common labor during plowing, not to exceed ₱5 per hectare, advanced after land is plowed.

Planting, including cost of puntas, ₱10 per hectare, advanced when planting is done.

Cultivation, ₱20 per hectare, to be advanced as each stage of the cultivation is finished.

Harvesting and transportation to mill, ₱25 per hectare, to be advanced when the crop is cut and delivered at the mill.

Milling, boiling, transportation, and other expenses incident to marketing, ₱40 per hectare, to be advanced after the work is accomplished.

Total, ₱100 per hectare.

The above amounts to be paid on presentation to the agent of pay rolls, vouchers, etc., who before payment must investigate and certify that the work had been accomplished.

For the purpose of repairing machinery, mill houses, warehouses, and other buildings, it was proposed to loan not more than 30 per cent of the value thereof, to be advanced upon the completion of repairs. For the purpose of purchasing work animals, not more than 50 per cent of the total value thereof, to be advanced after the purchase is made; and where the tenants had other property, personal or real, unincumbered, it was proposed to grant loans to them on their property of not to exceed 50 per cent of its value. It was proposed to charge 10 per cent per anum for such loans, of which it was estimated that not to exceed 4 per cent would be expended on the administration, 2 per cent to be set aside to cover any losses that might accrue, and 4 per cent to be paid to the sinking fund as interest upon the capital invested. The act proposed included such safeguards as appeared necessary and left to the secretary of the interior and the secretary of finance and justice the regulations under which the loans would be made. This act has been submitted to a number of tenants on the various estates, especially where formerly the cultivation of sugar was the principal industry of the people, and has met with their general approval, although some of the more radical believe the act is not sufficiently liberal to advance the interest of the cultivator to such an extent as they would desire. However, through conversation with some of the most important tenants, assurances have been given that the passage of this act would be of great assistance to them, and they could begin immediately the cultivation of lands which have lain fallow for more than ten years. In the original act it is proposed to begin this system of loans on the Santa Rosa estate in Laguna Province and to extend it if the experiment prove successful, but it is believed that, with careful administration, a large area of sugar land, both in Cavite and Laguna provinces, now lying fallow, would begin to produce crops within eighteen months if this proposed act were to become law. It is anticipated that very few additional employees would be needed in this bureau to carry out this law. It is estimated that there remains in the surplus fund from the purchase of friar-lands bonds more than ₱1,000,000 which would be available for such loans.

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IMPROVEMENTS ON THE ESTATES.

By reason of the large expenditures for surveying, drafting, and administration of the friar lands, it was not deemed essential in the last estimate submitted to ask for funds wherewith to make repairs on the buildings pertaining to the friar lands, and therefore practically no repairs have been made, the only exception being the building located at Biñan, Laguna Province, where a small sum was expended in repairing the roof. The buildings at Lolomboy, Bulacan, and Calamba, Laguna Province, are badly in need of repairs, the old tile roofing being in a dilapidated condition, leaky, and in some places unsafe, and should be replaced in each case with galvanized iron. Many doors and windows should be replaced and the walls repaired, but to accomplish this work satisfactorily would necessitate the expenditure of several thousands of dollars. The buildings at Imus and Naic, in Cavite Province, have been occupied by the military authorities throughout the year, and the rent paid has sufficed to meet the amount of interest accruing on the capital invested in each case. The leases entered into with the military authorities provided that all repairs necessary should be made by them, and this stipulation has been complied with. Notwithstanding the fact that the matter of the disposition of these buildings has been carefully considered during the past year, as yet no feasible solution has been reached and no recommendations are made. The buildings are eminently adapted to the purposes for which intended and to which at present devoted; but as for general purposes no demand exists therefor, as only business enterprises backed by large capital and transacting business on a large scale would be justified in either investing in such buildings or in leasing same. The building at Talisay, Cebu Province, is not such a structure as those to which reference has heretofore been made, but was formerly a residence and purchased by the friars. A portion of this building was found to have been demolished and the materials removed. The municipality of Talisay offered to lease the same for school purposes at the rate of ₱25 per annum. This offer, however, is so far below the price which should be paid therefor, that, rather than encumber the property for a given period of time, the offer was rejected. It is significant, however, in estimating the present market value of such property.

Under the heading of "improvements" in the Villegas estimate of the value of the friar lands were found items of ₱5,000 each for improvements on the Malinta, Piedad, and Tala estates. Diligent search for these improvements has failed to develop other than a quantity of building stone found in the walls of ruined hacienda buildings, and it was presumed that these were the "improvements" to which reference was made. If this be so, ₱15,000 worth of improvements which were purchased must be stricken from the assets of the friar lands, as they are of no value whatever.

IRRIGATION.

The irrigation systems on the different estates have received the attention of this bureau and the bureau of public works. An appropriation was obtained of ₱25,000 for reconstruction of the irrigation works on the estates of Laguna and Cavite provinces, and this amount has been expended under the direction of the director of public works with the approval of this bureau. Details of this work have not yet been received by this bureau, but it is known that the irrigation systems on all the estates are now in fair condition of repair and are furnishing all the water that is required. However, it is deemed advisable during the coming year to make extensive repairs to many of the dams and tunnels, and an estimate has been prepared and submitted to the extent of ₱60,000 for this work, which, when expended, should put the irrigation systems in such condition as will make further expensive repairs unnecessary for some years to come. As soon as the surveys have been completed on the friar lands, it is proposed to make accurate surveys of these irrigation systems for future reference and possibilities. The actual area irrigated is as yet unknown. The contours and levels have never been taken, and no data are at hand with reference thereto. Many of the old ditches which were closed have been reopened and are in working order, but an extensive study by a qualified engineer will be necessary before these systems may be fully developed along scientific lines.

The bureau employs an American superintendent of irrigation, 7 foremen, and 30 laborers in the repair and upkeep of the irrigation systems and the distribution of water, the minor repairs being made by this force.

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No attempt has been made to charge for the use of water from the irrigation systems, nor was it considered advisable so to do until such time as the areas of each person's holding on the estates are known. Thereafter it is believed that regulations can be prepared and fees collected which will be sufficient for maintaining the irrigation and provide for the interest and sinking fund on the capital invested, without great objection from the users of the water.

RAILROADS.

A new feature which will tend to enhance the value of lands included in many of the friar estates is the construction of railways, which is now progressing to such an extent that the embankments are nearly completed. These railroads cross the following estates: Muntinlupa, Biñan, Santa Rosa, and Calamba, in Laguna Province; and Imus, San Francisco de Malabon, Santa Cruz de Malabon, and Naic, in Cavite Province; and both the estates in Cebu Province. To what extent the railroads will assist in extending the cultivated areas of these estates it is impossible to estimate, but that they will furnish much needed facilities for transportation of crops to market and will open portions of the estates heretofore inaccessible are apparent. The railroad companies have entered into an agreement with this office and taken possession of these lands with the understanding that they are to pay for same as provided in the friar lands act, and they have already settled with the tenants of many estates for the damage done to the improvements on the land taken.

CONDITIONS ON THE VARIOUS ESTATES.

Banilad.—While a considerable number of leases have been executed for lands, showing an increased leased area and corresponding rental, it may be said that on the whole the conditions have not changed materially.

During the past fiscal year, however, this estate has been surveyed, and it will be but a short time until the true area and class of each holding will be known. Once this information is at hand it will be possible to execute new leases, incorporating therein the true area of each parcel and securing returns in accordance therewith. The collections during the past year have practically equaled the contracting rental. It has been believed from the beginning that the areas of most parcels, as declared by the tenants, were less than one-half of what they in reality contained. But, notwithstanding this belief, it was not possible to undertake the correction of such discrepancies until the lands were surveyed. The survey is now practically ready and it is confidently expected that while few new leases may be expected, the area under lease and the contracted rental therefor will more than double before the coming fiscal year has elapsed.

So far as agricultural conditions are concerned, no change in the same can be expected. This entire estate is composed of lands not highly favorable for agricultural pursuits, the soil being sandy and crops entirely dependent upon the rainfall, and the only commendable feature in regard to this estate consists in its location, taking in, as it does, a portion of the outskirts of the town of Cebu. The new railway from Cebu northward will cross this estate.

Binagbag.—The status of this estate from a financial point of view remains unchanged. The lands have been classified during the past year and considerable thereof found to be altogether worthless. But few new leases have been executed, for the reason that the limit had already been practically reached. No change in the incorrect areas expressed in the various leases has been made, owing to the fact that it was expected to issue sales certificates, and the amount involved did not seem to justify the time and expenditure for executing leases that were expected to be canceled at any moment. That sale certificates have not been issued may be attributed to an expressed inability of the tenants to purchase. The year last past, however, has been a comparatively prosperous one and it is hoped soon to realize the hopes expressed in the last report hereon.

Biñan.—Relatively speaking, this estate has not advanced any appreciable degree, and the outlook for the immediate future, from a financial point of view, can not be characterized as particularly bright.

While there can be no doubt but that the areas of the parcels heretofore leased have been understated, yet the discrepancy will not be found so great on this estate as on others, owing to the fact that old friar rent rolls were at hand for the purposes of reference. However, it may be assumed that the

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leased area will increase by one-fourth during the coming fiscal year, the survey already having been completed. The lands now leased and under cultivation are rice lands exclusively, it may be said, although a few parcels have been planted with sugar cane. But there are not less than 1,500 hectares of sugar lands that lie idle to-day. No one will lease these lands by reason of the prevailing low market value of sugar, the lack of capital, and, above all, the lack of animals with which to till the soil.

Under normal conditions this estate should easily produce a revenue considerably in excess of the total charges accruing against the property, but the prevalence of disease among the work animals and the inability of the tenants to raise capital with which to engage in agricultural pursuits renders advancement a matter of considerable conjecture unless some adequate measure be adopted which will effectively remedy the depressing conditions now prevailing. The new railway from Manila to Batangas will cross this estate, and embankments therefor have been constructed.

Calamba.—Some progress has been made during the year last past, but taken on the whole the conditions can not but be considered extremely unsatisfactory. That the areas of parcels of rice lands have been greatly understated can not be doubted, but it has thus far been impossible to regulate this discrepancy. Again, the San Cristobal dam, which was washed out in 1896, furnished water for not less than 500 hectares of land which to-day figure as rice lands of the first class on paper, but which in reality have reverted to the class of lands which are non irrigable and in consequence produce a correspondingly reduced rental.

Futhermore, the Philippine Sugar Estates Development Company (Limited), reserved 800 hectares of sugar land in the immediate vicinity of the town of Calamba, convenient to the lake and in demand, therefore, by the natives. Those residents of Calamba who have been able to undertake the cultivation of sugar cane, and there are a number of such persons, have naturally elected to cultivate those lands lying almost at their doors. It is a matter of slight importance to one attempting to make a living whether or not he may purchase the land he cultivates, and particularly is this the case where the price he must expect to pay amounts to a figure representing to him affluence. It is of vital importance that his efforts be productive of the greatest possible returns wherewith to meet his present pressing needs; hence, under the prevailing agricultural depression, it is not surprising that sugar lands of the government lying farther away should be practically abandoned.

It would be but to invite future criticism for this bureau to make any prognostications of a favorable nature at this time, for it can not be doubted but that the Calamba estate will prove a millstone to the Friar-lands fund for some time to come. Government assistance will undoubtedly hasten the coming of better times, but even this measure can only be expected to alter conditions gradually. The Manila-Batangas Railway will cross this estate.

Dampol.—This estate has been surveyed, the lands classified, and its registration is now pending in the court of land registration. It was stated in the last annual report that these lands would be placed on sale during the early part of the past fiscal year. Pursuant to the aforementioned plan a notice was issued to the tenants that rent must be promptly paid in full, in order to commence the issuance of sales certificates to those who desired to purchase their holdings. This notice resulted only in the filing of a petition signed by all of the tenants holding agricultural lands requesting that they be given time within which to pay their rent, basing such request on the lack of animals, financial embarrassment, and agricultural depression. This entire estate being leased to the limit and the total contracted annual rental (the payment of which would occasion much hardship, it was claimed), amounting to approximately two-thirds of the amount of the annual interest on the capital invested, it was considered but a waste of time to endeavor to proceed with the issuance of sale certificates by virtue of which one-tenth of the value of the lands must be paid annually, together with the 4 per cent accruing on unpaid balances, amounting to even more than the present annual income. An entire year has been permitted to elapse in the hope that under auspicious circumstances the financial condition of the tenants would so far improve as to permit of their purchasing the lands. Now, a second attempt is to be made in the immediate future, and should this fail, there will be no recourse but to double the rates of rental, a remedy which has not been invoked heretofore by reason of the fact that the rates now in force approximate those charged in Friar times. Even the rates

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productive of the desired results during the first year. Extensive repairs have been made to irrigation structures during the past year, and it is believed that the supply of water for irrigation purposes is now a volume equal to the maximum supply ever before obtained. Some slight changes for the better in the rentals for rice lands may be anticipated as a result of the repairs to the irrigation system, but on the whole it is believed that the increase in revenue from these sources will not equal that which is anticipated on other estates. The projected Manila and Naic Railway will have its southern terminus on this estate.

Orion.—During the past year this small but comparatively prosperous estate has dropped back somewhat with respect to area leased and the revenue derived therefrom. These decreases have been occasioned by the relinquishment of sugar lands by the former occupants of the same. Several large tracts of sugar land were in the beginning leased by the former occupants, but after a year's trial they were again surrendered, for the reason that the lack of capital and animals made it impossible to work these lands, and, seeing no prospect of being able to do so in the near future, they deemed it advisable to discontinue paying rent therefor and relinquished all claims to the preference right of purchase at time of sale. The lands thus surrendered have not been re-leased by other persons, as the majority of the occupants are in the same financial condition as those who have surrendered the lands, and consequently will not undertake to cultivate or to assume any financial responsibility for the same. There is practically nothing which can be done now to remedy this condition of affairs. It is true that maguey or some similar crop might be grown on these lands to future advantage; but as returns therefrom can only be expected after a considerable lapse of time, there are but few who are financially able to undertake the cultivation of these crops, most people being engaged in growing such crops as will yield immediate returns with which to provide for their pressing needs.

Piedad.—The area and annual rental have practically doubled during the past year, owing almost entirely to the correction of the areas expressed in the leases first executed. Some few new leases have been executed during the year, but progress in this work has been very slow. Notwithstanding the fact that this estate lies within a very short distance of the city of Manila, and by reason of its location would seem to be in considerable demand, such is not at all the case. It is hilly almost throughout, and in the hollows lying between the various hills there are strips of land of great fertility upon which good crops of rice are grown. On the other hand, on the hillsides the depth of the soil is but slight, and on the hilltops it is even less. Again there are areas of land comparatively level or with a gentle slope upon which the bare rock shows above much of the surface, and only small pockets of earth are to be found. On lands of this character not even maguey may be successfully grown; hence quite a large number of hectares are absolutely worthless in so far as agriculture is concerned, and at this time there is no other purpose to which they might be devoted and for which a return might be obtainable. Although the boundary is not to exceed 5 miles distant from the city of Manila, the road leading out from the city is in an almost impassable condition for vehicles, and the marketing of the produce is an expensive and tiresome matter owing to difficulties of transportation. The shortage in work animals in this section is keenly felt, and there seems no prospect of materially lessening this shortage in the near future. The employment of modern machinery as a substitute for animals would not be possible on the greater part of this estate, by reason of the scantiness of the soil and the rocks which project above the surface on those parts which are comparatively level, and on the remaining portions by reason of the pitch of the land itself. While it is hoped to remedy to some extent this lamentable condition of affairs, the nature of the various obstacles is such that the future holds forth no great promise.

San Francisco de Malabon.—While a number of new leases have been executed for the lands during the past year, the progress made has been comparatively little compared with that anticipated. Owing to the fact that the survey has reached quite an advanced state, it is anticipated that a relatively satisfactory showing may be made ere the close of the coming fiscal year, but because of a lack of definite information it has not been possible to correct thus far the discrepancies in areas made at the time of executing the first temporary leases. Some of this work of correction has already been performed, and it has been found that in nearly every case not to exceed one-half of the land actually occupied was declared by the occupants of the same at the time of executing

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the leases therefor. While it is anticipated that the contracted annual rental will be increased by several thousand pesos during the coming year, it is not expected that the same will reach a figure high enough to defray the interest charges and expenses of administration incurred. This conclusion is based upon the fact that the greater part of the lands are sugar lands which have been abandoned for years, are overgrown with rank vegetation, difficult and expensive to clear, upon the scarcity of work animals, and the lack of means and necessary capital on the part of the tenants. The irrigable lands may be said to be all taken up; and while the exact area of the same is not yet known, it will be in the near future, and this information will be embodied in the new leases for the same. During the year last past a large amount of money has been spent on the repair of the irrigation works, and there can be no complaint of a shortage of water for irrigation purposes. As a result of the surrender of Montalan, De Vega, and other leaders of the ladrones who hovered around the immediate vicinity, and particularly the first named, who is a native and former resident of San Francisco de Malabon, and whose family and relatives reside there at the present time, a feeling of comparative assurance is now felt, and many people are moving out into the barrios and erecting their houses along the main roadways where the same in former years stood. While in many instances these people are merely the employees of the larger landholders, or are working the lands of such tenants on shares, and no immediate benefit to the estate in the way of additional leases and increased areas and rentals may result therefrom, yet this fact evidences the beginning of more prosperous times for the lessees of the estate and the community in general, which will in turn result beneficially for the government, although at some later date. It is believed that steam plows could be used to advantage in the cultivation of the sugar lands; and were the government to lend the tenants temporary financial assistance, in the course of approximately two years it is believed that this estate might be placed on a comparatively satisfactory financial basis. If such assistance be not forthcoming, it is anticipated that considerable time must elapse ere this property becomes self-sustaining. The new railway from Manila to Naic will cross this estate, and construction work is progressing thereon.

San José de Mindoro.—During the past fiscal year the conditions prevailing have remained practically unchanged. No office has been established for the same reason as given in the last annual report, the absence of any considerable number of occupants; the fact that the expense for executing leases would be greater than the revenues for which contracts might be entered into, and the complete absence of any hope of securing people from elsewhere to take up portions of this estate. The arrangement previously entered into with the Recoleto Order of Friars for grazing privileges, whereby the sum of ₱0.20 per month is charged for each animal two years of age and over has been continued throughout the past year, and the only revenue derived from this estate has been obtained from this source. The agricultural possibilities of this estate can hardly be exaggerated. Experiments conducted with greatest care during the time of the Friars have demonstrated clearly that there is almost no crop grown in the Philippine Islands which can not successfully and profitably be grown on this estate. A large portion could be irrigated at small expense, as two large rivers with an abundant flow of water cross the estate and a number of smaller rivers have their source within the estate itself. The higher nonirrigable lands are particularly adapted to the growing of cocoanuts, abaca, maguey and many other profitable crops. A small quantity of tobacco was planted as an experiment, and those in a position to best judge of the matter feel assured that the returns which might be obtained from this crop would be exceptionally abundant in quantity, superior in quality, and profitable financially. While the cattle industry has proved to be a most flourishing and lucrative enterprise and the percentage of increase phenomenally high, the great fertility and exceptionally favorable nature of the conditions are such as to warrant the belief that the lands should not be devoted to cattle raising, by reason of their great adaptability to agricultural pursuits. Unless persons of considerable means, capitalists, or corporations can be induced to take up large holdings it is safe to predict that the same will remain practically in a state of abandonment for many years to come. This bureau would be able to offer tracts of land of almost any description desired, and under the most favorable conditions, to anyone desirous of engaging in agriculture or stock raising. These lands might be purchased outright or leased at a reduced rental for a term of three years, as desired.

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San Marcos.—It was found impracticable to dispose of this small estate by sale during the year last past, as was confidently expected, but it is hoped that a similar attempt soon to be made will meet with more favorable results. Should it not be possible to dispose of the lands in this way, the contracted annual rental will be increased to a figure sufficient to pay all charges accruing against the property.

Santa Cruz de Malabon.—The progress made during the year last past has been relatively small. But few new leases have been executed, and for lack of necessary data it has not been possible to alter the figures shown in the leases executed for the lands—figures known to be extremely inaccurate. The survey having been recently commenced, it is expected that during the coming year the leased area and annual contracted rental will be increased very materially. The conditions prevailing are, in almost every respect, similar to those obtaining on the adjacent estate of San Francisco de Malabon, as regards the character of the lands, lack of capital, the dearth of work animals, and the prevalence of disease. The minor structures of the irrigation system have been repaired as far as possible, but several of the principal structures remain to be repaired during the coming year. It has not been possible to effect the repair of these larger dams during the year last past for the reason that it was of the utmost importance that attention be given the irrigation works on the San Francisco de Malabon estate, owing to the fact that a large proportion of the water for irrigation purposes used is secured from structures located on the San Francisco de Malabon estate, and it was therefore important that the source of supply receive attention first. As is the case on other estates in the province of Cavite, unless something be done to assist the occupants of this estate, the great bulk of these lands—sugar lands—will remain idle for a long time to come. The Manila-Naic Railway will cross this estate.

Santa Maria de Pandi.—A considerable number of new leases have been executed for the lands of this estate during the past year, and a consequent increase in the leased area and contracted annual rental thereby secured. However, as has been noticed on all other estates where the bureau has had to depend entirely on the statements of the lessees as to the area and class of each parcel of land, it is believed that the area of the lands actually occupied is double the amount shown by the leases executed therefor. The lack of information and data to enable the correction of these discrepancies has necessitated the continuance in force of the leases as originally executed. The survey has now so far advanced that in the near future, upon the expiration of the present leases, it will be possible to discontinue the same and execute in lieu thereof new leases embodying relatively accurate areas, thereby securing a corresponding increase in the contracted annual rental. According to the Villegas estimate of this estate, all the lands are rice lands, the same being divided into 5 classes. This may be true, but if so, then it may be stated with equal truth that all cultivable land is rice land. So far as known there are but 11 small dams and 2 auxiliary or secondary structures. These are placed across the outlets of comparatively small catchment basins. With perhaps but two exceptions there is no running-water supply, and the main purpose sought by these structures is that of diverting the run-off of the rains. The greater part of this estate is rolling country, the height of the hills varying from 50 to 250 feet, and the lines of drainage are from within and toward the boundaries; thus the general slope of the country is opposed to the lines along which water must be brought if an attempt were to be made at securing water for irrigation purposes from the Angat or Santa Maria rivers. Were it not for the thousands of hectares of uncultivated land, uncultivated for the reason that the same has practically no value for agricultural purposes, estimated to be worth ₱25 per hectare in the Villegas estimate (and as the purchase price paid for this estate is over ₱200,000 in excess of said estimate it is reasonable to suppose that this estimated value was in nowise reduced), there would be entertained the hope of eliminating a deficit on account of this estate during the coming fiscal year; but under the circumstances no such optimistic view can be taken of the matter, and the most that can be said is that the deficit occasioned by recurring charges will be materially reduced. The lack of a sufficient number of work animals is somewhat of a handicap, but this shortage is not so great on this, or any other of the estates in Bulacan Province, as it is on those estates situated in other provinces.

Santa Rosa.—A number of new leases have been executed for lands during the past year, and the area thus leased, 1,000 hectares, is considered as being a very flattering showing. That the annual contracted rental has not seemingly

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increased in the same ratio as the area is due to the fact that the lands leased are, for the most part, sugar lands, and the rates of rental asked for this kind of land are the lowest on the estate. During the year past an arrangement was entered into, with the approval of the secretary of the interior, whereby this bureau was authorized to reserve certain tracts of sugar lands and to suspend the collection of rentals therefrom until a crop had been raised thereon. The bureau of agriculture was authorized to furnish a steam plow and to do the work of plowing at actual cost, payment for such work to be made simultaneously with the payment of rent for the lands. Certain tenants on their part undertook to clear the lands thus reserved, grubbing out the trees, underbrush, and cogon with which these lands were covered and undertaking to furnish wood and water for the steam engine and such labor and assistance as might be required of them. The aforesaid arrangement was inaugurated with the greatest enthusiasm on the part of many tenants. Many unforseen obstacles were encountered, and for a considerable length of time the results obtained were quite unsatisfactory and discouraging. Plows which had done satisfactory work in other lands here proved absolute failures, and but a limited number of hectares of land were plowed up to the time when it was no longer possible to put in a cane crop during the present calendar year, and work therefore was suspended. During this trying period the enthusiasm of the tenants waned and eventually died out, with but one notable exception. This man, the largest landholder, remained steadfast to the cause, did not for one moment cease in his endeavors to insure the success of the undertaking, and at no time hesitated in making any outlay necessary, regardless of the disheartening results obtained. The experiences of last season, however disheartening for the time being, have taught a lesson which has proved valuable indeed. The defects noted from time to time have been corrected and such alterations have been made as will accomplish the results desired. But a short time ago this plow was again placed in operation, breaking soil for planting cane during the coming year, and the results now obtained are most encouraging. Where but from 1 to 2 hectares were but indifferently plowed in a day during the past year the results at present obtained vary from 5 to 7 hectares per day of excellent work. As a consequence of this, interest has again revived, and it is confidently expected that from 300 to 500 hectares of sugar lands will be placed under cultivation this year. Notwithstanding the cheerful outlook for the betterment of the conditions during the coming year, it should be clearly borne in mind that the work of breaking up and plowing the land is but a preliminary step. After this land has been plowed and harrowed a large number of work animals will be required by the people in throwing up furrows preparatory to the planting of the cane and in cultivating the fields until such time as the cane reaches a height which will prevent further cultivation by plowing. In the planting of cane a large number of laborers must be hired and paid in cash, and a considerable expense is incurred by the planter. After the cane has reached a certain height it is necessary to cultivate between the rows by hand, which is another item of expense. The harvesting of the cane, cartage of the same to the mill, and subsequent conversion into sugar are each items necessitating heavy outlays on the part of the sugar planter. The result of a season's work can not be realized immediately, but a certain period of time must elapse before the sugar can be disposed of in the market. As previously stated, the preliminary step, that of plowing, may be considered as successfully taken and an accomplished fact, but the tenants lack the necessary work animals and capital to prosecute this work thereafter. It was with this end in view that this bureau submitted to the Philippine Commission for consideration a proposal for loaning money to these tenants in order to enable them to carry on to a successful termination the work heretofore begun. Should this proposal be rejected, it is almost an assured fact that these people will be unable to raise funds for this purpose elsewhere, in view of the fact that they are but the lessees of the land and can not pledge the same, and this would be the guaranty demanded by anyone who might contemplate advancing the necessary funds. The establishment of the agricultural bank would in nowise benefit tenants of the friar estates, for the reason above stated. The Manila-Batangas Railway will cross the estate and is already under construction.

Tala.—During the year last past practically the only advancement accomplished has been the result of the correction of the areas declared by lessees at the time of executing temporary leases. The drawbacks encountered are, to all intents and purposes, identical with the conditions prevailing on the Piedad estate, the only difference being that these lands are still more inaccessible than

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those of the Piedad estate and consequently are in still less demand. Notwithstanding the fact that the heart of this estate is within 8 miles of the city of Manila, communication with the city is a matter of such difficulty that the expense for transporting agricultural products to the city renders the marketing of the same almost prohibitive. The lands are rolling and hilly for the most part, and only those portions lying in the hollows between hills are suitable for the cultivation of rice. In former times sugar cane was grown on the highlands and hilltops, but at present, on account of the lack of work animals and capital, they lie idle and abandoned, only about one-eighth of this entire estate being occupied. The population is very sparse. During the coming year a special effort will be made to improve the conditions on this, as well as on the Piedad estate, by the introduction of maguey and other crops which will flourish under adverse conditions and will require but a limited number of animals, and by endeavors to induce people from other localities to take up land here. An effort will likewise be made to have the main road leading from Manila to Novaliches placed in such a condition as to permit of the passage of vehicles, and it is believed that when this is accomplished a demand may be created for the lands.

Talisay-Minglanilla.—The work of leasing has progressed satisfactorily during the past year, as will be seen by the large number of leases executed. The total of collections will also be noted as amounting practically to the full amount of the contracted annual rental. Notwithstanding the fact that a large percentage of the lands will be shown to be valueless for agricultural purposes, the small leased area shown and the similarly small amount of contracted annual rental can not be attributed to these arid lands. As was the case on other estates, practically no definite information could be secured concerning the holdings, and for the purpose of executing temporary leases the bureau had to rely upon the statements of the lessees themselves. As customary elsewhere, the area of each parcel was declared by the prospective lessee as a given quantity of palay or corn (according to the amount of such grain requisite to seed the given area of ground). In this province there was and is a generally accepted table of equivalents, which has been used in years past and generally accepted, and while the same was believed from the very start to be absolutely inaccurate, the opposition encountered was so bitter that it was considered good policy to accept the table and make use of the same in reducing to the metric system the area of each parcel stated according thereto. On the Luzon estates a cavan of palay was considered as 2 balitas realengos (or 1 hectare, 15 ares, 51 centares), and this figure has been found to fall short of the actual area in almost every instance. In Cebu the area equivalent for 1 cavan of palay was estimated at but 67 ares and 8 centares, or about one-half that employed in Luzon, the consequence of which is that the areas leased are believed to be stated as only about one-third of the actual size, and the annual rental consequently approximately but one-third of what it should in reality be. Owing to the fact that no information was at hand which would justify a change in the areas so declared and to the bitter opposition which would have been encountered had the bureau attempted arbitrarily to raise the areas of the various parcels of land, no change has been made in the leases as originally executed and the same have been permitted to continue in force. The survey having now been undertaken, it is hoped that during the course of the coming year there will be a material increase in both the total area and total contracted annual rental, even though but comparatively few new leases be executed. There are known to be quite a number of people residing on this estate who have refused absolutely to execute leases for the lands occupied, and who assert that they are themselves the owners of their respective holdings. Application for the registration of this estate has been made to the court of land registration, with a view of determining the legality of these pretensions with the least delay practicable, and it is anticipated that considerable litigation over the lands must ensue in the near future. The residents are believed to be gradually recuperating from the effects of the drought, and consequent famine, which occurred in this section during the year 1905, at which time thousands of people from the country were forced into the city of Cebu and lived for a considerable period of time upon the charity of others residing in town, if assertions of credible witnesses are to be accepted. Notwithstanding a material increase in the contracted annual rental is expected for the coming year, it is anticipated that the deficit will still be quite large. The lands of this estate are dependent almost entirely on the rainfall, and while a portion of the estate is classed as rice lands and irrigable, the supply of water is not constant. The streams from which the water is secured for irrigation should properly be classed as wet-weather streams, notwithstanding the fact they are dignified with the name of river.

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The exorbitant price paid for the lands is and will continue to be the main cause for the large deficit. Sugar lands of the first class, and lands suitable for the growing of corn, are stated in the Villegas estimate at ₱300 per hectare, and evidently were paid for at this figure, while sugar lands of the first class on the Calamba estate are valued at ₱60, on the Biñan estate at ₱100, and on the Santa Rosa estate at ₱150 per hectare, and the lands on the three estates last named are far superior in every way to similar lands on this estate. It is a matter of profound wonder how these figures were ever arrived at.

FRIAR LAND EXPENDITURES FISCAL YEAR 1908.

The following statement,[c] showing the expenditures for the friar estates for the fiscal year 1907, and submitted in accordance with the provisions of the last appropriation bill, shows the expenditures on account of each estate, segregated under subheads, indicating the cause of the expense and summary of the same.

CLASSIFICATION OF ESTATES PREPARATORY TO SALE.

One of the most important steps to be taken in arriving at the sale value of the lands of an estate is the classification of each and every parcel of the same. Under the provisions of section 12, act No. 1120, the classification of the lands of an estate is not a mere perfunctory procedure, but, on the contrary, is a matter requiring careful consideration and painstaking investigation, since it is provided that the value of a parcel shall be arrived at by "taking into consideration the location and quality of each holding of land and any other circumstances giving it value."

It was originally proposed to delegate this work to a committee of three, to be composed as follows: An employee of the bureau of lands, an employee of the bureau of agriculture, while the third member was to be preferably a tenant of the estate to be classified, well versed in matters of agriculture and the local conditions to be encountered, and whose standing in the community was such as to preclude allegations of bias, favoritism, or lack of practical knowledge or experience. The organization of this committee, constituted in the manner above mentioned, could not be effected, owing to the inability of the bureau of agriculture to spare the services of a practical man. Thereupon it was suggested, and duly approved, that the lacking member be some prominent man residing in the province. Pursuant to this arrangement a committee was duly appointed, with Mr. Pablo Tecson, of Bulacan Province, as chairman, and the classification of the Dampol, Bingabag, and Guiguinto estates undertaken, in the order named. The work accomplished by this committee was of the highest order of excellence, and the results have surpassed even the most sanguine expectations, being most thorough, painstaking, conscientious, and equitable in character, and no item was considered as too insignificant to merit just attention. The plan has been so satisfactory in practice that it will be carried out on all estates.

PUBLIC LANDS.

The work in relation to public lands has been greatly increased, owing to a greater activity in the applications for public lands, due to the large amount of advertising, not only by this bureau, but by the employees of the bureaus of forestry, education, and constabulary, who have all contributed to the dissemination of knowledge relative to the public land law. This bureau, in addition to the distribution of over 20,000 circulars, has had three agents in the field for the larger part of the year explaining the laws, assisting applicants in preparing applications, inspecting the lands, and investigating contests. There have been 12,029 applications of various kinds filed for public lands, which may be compared with 3,392 filed prior to the beginning of this fiscal year, as follows:

Kind of application.	Fiscal year 1907.	Previous.	Total.
Homesteads	2,669	805	3,474
Free patents	8,607	730	9,337
Sales	86	82	168
Leases	12	10	22
Coal	136	150	286
Mineral	519	1,615	2,134
Total	12,029	3,392	15,421

[c] Omitted and filed in the Bureau of Insular Affairs, War Department.

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Owing to the increase in the work, increased personnel has been necessary in the public lands division, and yet it has been impossible to keep current its work. It has also been found necessary to use the Spanish language in conducting the correspondence of the division, in a great measure, as explanations made in English relative to necessary corrections in public land applications are not generally understood, while by the use of the Spanish language the applicant can usually obtain a translation into the native dialect. A great majority of the public land applications are signed by a cross, indicating that the more ignorant Filipinos are making the majority of the land applications.

For the purpose of reporting upon the various methods of obtaining public lands, the following order will be observed: Homesteads, sales, leases, free patents, town sites, unperfected titles, coal lands, mining claims.

HOMESTEADS.

[CHAPTER I.—Public land act.]

During the fiscal year 2,669 homestead applications were received, while the total number on file June 30, 1907, was 3,474, covering an area of 38,963 hectares. Of this total number of entries, 748, covering an area of 9,290 hectares, have been allowed. The balance of the applications are in various stages of progress, as shown by the detailed statement relative to homestead applications attached hereto [on file at Bureau of Insular Affairs], which shows the rejection, cancellation, or withdrawal of 297, covering 3,257 hectares of land. There are also 350 applications, covering an area of 4,484 hectares, which are merely awaiting payment of the initial fee of ₱10 before being allowed. The total number of initial homestead entry fees received during the year was 818, amounting to ₱8,180. The total number of homestead initial entry fees liquidated and deposited to the credit of public lands was 598, amounting to ₱5,980.

The average area of a homestead, as shown by the applications on file, is a trifle over 11 hectares. As to homestead applications it may be stated that the filing of a homestead application does not, in every case, mean a bona fide intent on the part of the applicant to comply with the law, as reports have been received from agents of this bureau that homestead applications are being filed for parcels of land which the applicants, after one crop, dispose of to whomsoever will purchase same. In other cases it appears that applicants have filed homesteads for the purpose of cutting the timber, using their homestead applications as a means of defense to their right to cut timber when they had no intention of further complying with the law, and are not, therefore, bona fide homesteaders. Complaint has also reached this bureau that some applicants go so far as to use their homestead entries as roving commissions to cut valuable timber in the locality, and declare the timber, when brought to market, as having been cut on the land described in their homestead entries, when it is known to the forestry officials that the land entered by them contained no such timber. Many applicants have no idea that the law really means what it says regarding occupation and cultivation, or that, if they do not comply with the provisions of the law, they will ever be deprived of any portions of the lands they have entered. There is also a class of people who are locally influential who are reported as using the provisions of the homestead act to secure titles to larger tracts of land than permitted under the law. Their method is to require their aparceros, who are generally ignorant, to apply for the land under the homestead law. Such aparcero does not know the purpose of the application; or if he did it would make no difference, as he is absolutely under the control of the cacique, who thus endeavors to gain, at some time in the future, an absolute title. That this is the practice there seems little doubt, but to prove it is very difficult. However, rigid investigations will be undertaken in suspicious cases of this nature and, in cases of sufficient evidence, prosecutions will follow.

The homestead law provides for an entry fee of ₱20. The average area of a homestead may be said to be 11 hectares. Basing the cost of surveys which the government makes free for all homesteads upon the average cost of surveying done by this bureau for the past year—₱3 per hectare—it may be seen that the average cost of surveying a homestead is upward of ₱30; and it is estimated that the average cost of the clerical work and investigation necessary during the five years before the entry can be allowed will make the cost to the government for each homestead entry perfected and surveyed, approxi-

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mately ₱50, for which the government has received only ₱20, leaving the cost to the government for each homestead perfected approximately ₱30.[a]

SALES.

[CHAPTER II.—Public land act.]

During the fiscal year 86 sales applications were received, covering an area of 2,697 hectares, and up to June 30, 1907, there have been received in the bureau 168 sales applications covering an area of 4,987 hectares. Of these entries, 14 sales have been accomplished, consisting of 1,347 hectares, to the value of ₱15,928.01, of which amount ₱3,984.06 have been received, and the balance, ₱11,944.03, will be due within the five years provided by law. One sale of 16 hectares was relinquished after the first payment of ₱40.80, leaving a balance of ₱122.40 unpaid. Statements showing the sales applications received, by provinces (on file at Bureau of Insular Affairs), and the status of same to June 30, are attached to this report. Sales applications received prior to this fiscal year, owing to ignorance of the law on the part of the applicants, have been such that in 5 cases no bids were received. Of the 168 applications received, 3 from individuals were of no value whatever, and were immediately rejected; 13 were from corporations, and averaged 267 hectares each, while 152 filed by individuals had an average area of 9 hectares each. Of the 152 bona fide applications for sales 36 included an area of less than 1 hectare, 24 an area of from 1 to 5, 40 from 5 to 16, and 52 of 16 hectares each.

Section 17 of the sales chapter of the public land act provides for free surveys when the purchasers are individuals, and the cost thereof, when such small areas as mentioned above are sold, more than exceeds the appraised value placed upon the land, and, in consideration of the fact that the government pays for the advertisements of sale, it will be observed that applications for quantities of land less than 5 hectares, if sold, result in an expense to the government, and if not sold, the government must bear all the expense of advertising. If future experience does not show a change in this condition, an amendment of the law should be made, providing that in no case in the sale of public land should the price received be less than the expense of the sale to the government.

Under the present law individuals and corporations are restricted to the purchase of one tract only of public land. From past experience it is believed that either individuals or corporations should be allowed to purchase as many contiguous tracts as they desire, provided the total area does not exceed that provided by law. The advantage of such an amendment being that applicants could then purchase one tract up to the limits of their resources and, after such tract was brought under cultivation, could extend the limits of their holdings by the purchase of an additional tract or tracts. The class of people who would take advantage of this amendment are those who assist materially in the development of the agricultural resources of the country. It is probable that during the coming year an increased number of sales of public lands will be accomplished and increased revenue from this source result.[b]

LEASES.

[CHAPTER III.—Public land act.]

Only 12 lease applications, covering an area of 5,921 hectares, have been received during the fiscal year, making a total of 22 on file to June 30, 1907, covering 12,279 hectares. Six of said applications, covering 3,798 hectares, have been withdrawn, and the balance are in various stages of progress. One lease of 32 hectares, with an annual rental of ₱16 has been executed. The question of surveys has delayed the execution of further leases, as the cost thereof is charged against the applicant, and it has been impossible for this bureau to furnish surveyors. Detailed statement covering the status of lease applications is submitted herewith.[c]

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[a] A detailed statement showing homestead applications received during 1904–1906 has been omitted and filed in the Bureau of Insular Affairs, War Department.

[b] A detailed statement showing sales applications received during 1904–1907 has been omitted and is on file in the Bureau of Insular Affairs, War Department.

[c] A detailed statement showing lease applications received by this bureau, and their status June 30, 1907, has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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It is estimated that several leases in the Davao district of the Moro Province will be accomplished during the coming year, as several applications for survey have been received, and a surveyor is in the field at the present time, and it is expected that there will be sufficient work to keep a surveyor there for at least a year. There are now believed to be about 30 hemp plantations on public lands which have recently been started in the district of Davao, in the Moro Province. These settlers requested through the Moro legislative council the extension of the public land act over the Moro Province, and the Philippine Commission extended the lease chapter of the public land act over the district of Davao, excluding 5 municipalities. The settlers were not entirely satisfied, as they could not purchase these lands, and did not feel warranted in leasing land and making extensive improvements on the basis of a 25-year lease. Their objections were stated through the legislative council of the Moro Province to the Philippine Commission, who referred the matter to this bureau, and the following is an excerpt from the minutes of the council and the reply of this bureau thereto:

"Sec. 5. But all persons or corporations in the district of Davao, who come within the terms of the resolution of the Philippine Commission extending to the Moro Province certain provisions of the public land act, stated in such resolution, which provides for the leasing of public land within the Moro Province, shall have preferential right of purchase from the government, at the price fixed by law, of the said leased or occupied land by such person or persons or corporation, at the time such public lands are made available for sale and purchase, or at any time thereafter, subject only to the limitations provided by law as to the amount of land which each person or corporation may by purchase acquire."

To which this bureau replied as follows:

"It appears that those now occupying public land in the Moro Province have a reasonable ground for complaint, but the remedy proposed is not, in my opinion, the proper one. It should be, that those who have occupied and leased public land in the Moro Province within the district in which public land may not now be obtained by purchase, should be permitted, within one year from the date when the purchase clause of the land act is applied to said district, to make application for the purchase of the tract of land previously leased, and agree to relinquish their leasehold rights upon the sale of said tract of land under the provisions of the public land act: *Provided*, That in fixing the valuation of the land to be placed upon sale by the bureau of lands, the appraisement shall be made as if on the date of the original lease of said land, without regard to the improvements made thereon by the lessees; and an additional appraisement shall be made of the improvements found upon the ground at the time of appraisement; and that bidders shall bid separately upon the ground and upon the improvements so that, in case the lessee becomes the successful bidder the government shall receive only the amount paid for the land; and in case the lessee is not the successful bidder, then the government to reimburse him for the amount received from the successful bidder for the improvements. In this manner, those who have leased public land and are making improvements would be reimbursed for such improvements provided they were not the successful bidders, and would not be compelled to pay a second time for their improvements were they the successful bidders. In other words, at the present time a corporation taking up land in the Moro Province and leasing same has no guaranty beyond fifty years, when all it has spent in improvements may be lost, while at the same time it is now prohibited by law from purchasing the land, due to the fact that the sales chapter does not apply in said province."

It is the opinion of this office that every consideration should be given those settlers who have gone into the island of Mindanao for the purpose of pursuing an agricultural career, and it is believed that as soon as possible the land act should be further extended in this island, and recommendations should be called for from the government authorities as to in what districts and to what extent the land laws could be extended to this province without jeopardizing the interests of the native inhabitants or interfering to any great extent with their tribal customs. Reports from the district of Davao lead to the belief that the settlers are becoming satisfied with the lease provisions of the law which has been extended to them as they understand its purport; and whereas heretofore

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they were complaining of the area which they were allowed to take up, they are learning that a plantation of 1,024 hectares is a very large plantation; in fact, so large that few, if any, of them will be able to cultivate it entirely for many years to come, as most of the settlers represent corporations with limited capital. It is believed that little, if any, further complaint will be made.

The appointment of deputy land surveyors, as heretofore recommended by this bureau, who could make surveys of public lands to be leased, would materially assist in accomplishing leases.

FREE PATENTS TO NATIVE SETTLERS.

[CHAPTER IV.—Public land act.]

The number of free patent applications received was 8,607, and the number received previous to the last fiscal year was 730, making a total on file of 9,337, covering 30,230 hectares, an average of 3⅛ per application. The great increase in the number of applications received this year is due, in a great measure, to the work of agents of this bureau traveling through the provinces instructing the people in preparing their applications. Of the total number received, 1,061 have been rejected, canceled, or withdrawn. There are ready for survey and investigation 6,775, and the balance are in various stages of completion. Detailed statement showing, by provinces, the number and area of applications received and their present status is submitted here below.[a] It will be noted that by far the largest number of applications for free patents has come from the provinces occupied by the non-Christians. These figures tend to confirm the predictions of this bureau in the last annual report that the provisions of this chapter are of more benefit to this class of people than to any other. One difficulty which tends to delay the presentation of applications is the inability of the petitioners to properly prepare their blanks or secure internal-revenue stamps, and even the agents of this bureau have been compelled to remit large numbers of applications with the money for stamps, as no internal-revenue stamps were available.

It should not be presumed with 6,775 applications pending investigation and survey that anywhere near such number will finally be allowed, for the reason that the same remarks which applied to homesteads apply to free patents, and it is almost certain that hundreds of these applications, when critically examined upon the ground, will be found defective and declared void, and the applicants will be found to have no right to avail themselves of the provisions of this chapter. Act No. 1573 of the Philippine Commission extended the time within which applications under this chapter could be presented from January 1, 1907, to January 1, 1909. Objection to this extension was made in the last annual report of this bureau for the reason that practically all property holders outside of the non-Christian peoples who could comply with the provisions of this chapter have been in possession of their lands a sufficient length of time to avail themselves of the provisions of "Chapter VI—Unperfected titles," and they would suffer no particular hardship if this chapter had been allowed to stand as originally enacted. It was contended that the fee of ₱20 for registration in the court of land registration was not excessive, and as recent legislation has reduced this fee to ₱10 where the property does not exceed ₱200 in value, it is urged that no further extension of this provision of the public-land law be made; but if the same is made it is recommended that it contain a provision compelling the applicants to reimburse the government for the entire cost of granting patents under this chapter, including the survey. It has heretofore been stated that the average area of a free patent applied for is about 3⅛ hectares. On the basis of the average cost of surveys in this bureau for the past year, the cost of each free-patent survey will exceed ₱10. It is estimated that the cost of an investigation of the rights of an applicant to a free patent, the clerical work in relation thereto, and the issuance of a patent will be ₱20—that is, the expense to the government for each free patent issued will be at least ₱30. This being the case, and assuming that even two-thirds of the applications received are granted, it will mean an expense to the government of approximately ₱200,000, with a year and a half in which to receive further applications under the provisions of the law. Many

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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applications for free patents have been denied on account of the noncompliance with some of the provisions of the law in relation to occupation, and in the notifications to the applicants of the denial of their applications has been included advice to secure their land under the provisions of the homestead law, and many have followed such advice. It is estimated that several thousand more free patents will be filed during this fiscal year, as they are being received at the rate of about 500 per month.

TOWN SITES.

[CHAPTER V.—Public land act.]

At the close of the last fiscal year Baguio town site was the only town site which had been reserved and only one other had been ordered surveyed. There are now seven which are receiving the consideration of this bureau, as follows: Four in the Moro Province (Parang, Jolo, Dansalan, and Malabang), one in Zambales Province (Olongapo), and one in Bulacan Province (Sibul Springs), all in addition to the Baguio reservation. In relation to the Baguio town site it may be stated that during the year an addition thereto was made consisting of 2,995.38 hectares, making the total area of the town site 5,595 hectares, or 21.6 square miles. A third subdivision of lots has been surveyed and platted, and a second sale was held in Manila on July 20, 1906, at which time all the lots which had been surveyed were disposed of at prices ranging from 2 to 13 centavos per square meter, a material increase over the prices formerly obtained. Some delay has been occasioned in the placing on the market of further lots for sale by the fact that prior to the survey of any new lots the approval of the insular architect is necessary, and while it was confidently expected to have a sale the latter part of the year, the same has necessarily been postponed, but should be held within sixty days. The purchasers of lots in the Baguio town site have not been confined to persons in the government employ; in fact, a majority of the purchases in the second sale were by persons in no way connected with the government, thus disproving the oft-repeated assertion that Baguio would be exclusively for government officials and employees. The military reservation at Baguio within the town site has recently been increased in size by Executive Order of the President. This addition is located to the south of the former reservation and does not interfere with the original plans of the subdivision contemplated by the insular government. There have also been submitted and approved by the Philippine Commission during the year a market site in the municipality of Baguio, a park reservation, and an industrial school site reservation. In addition a large plot of ground was sold for educational purposes. Patents for the first sales of Baguio lots have been signed by the chief executive and sent to the register of deeds at Baguio for the issuance of titles. Detailed statement[a] showing the lots sold in the Baguio town site is submitted herewith, which shows that there have been sold 196 lots containing an area of 189 hectares to the value of ₱25,502.62, in addition to the valuation of the school buildings sold of ₱6,200.

UNPERFECTED TITLES.

[CHAPTER VI.—Public land act.]

There have been received 367 notices from the court of land registration relative to applications which have been presented to said court, in which the applicants have requested the benefits of Chapter VI of the public-land act. An investigation of these cases has led this bureau to request the attorney-general to enter appearance in 128 cases and opposition in 54. No action was taken in the balance, as in the opinion of this bureau the applicants were entitled to the registration of their property, or the land involved was not of sufficient value to warrant opposition by the government. Experience has demonstrated that it will be absolutely necessary for this bureau to adopt a very rigid course in the investigation and opposition of cases where large areas are involved, as it is found that actual occupation as comtemplated by the law has, in most cases, not been sufficient to warrant the registration of the areas applied for, and unless his course is pursued the government will lose large tracts of valuable land. Several cases which have been decided by the court of land registration in favor of the applicant have been appealed to the supreme court at the request

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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of this bureau. Such cases usually involve general principles, such as the granting of titles to nonagricultural lands, which appears contrary to law; or that the evidence presented did not show open, continuous, exclusive, and notorious possession and occupation. Some of the decisions of the supreme court in cases during the year have been of value to this bureau, and better enable future opposition in cases where the applicant has occupied, cultivated, and used only small parts of large claims, and endeavored to obtain title to entire claims. In one decision it was held, by implication, that the pasturage of cattle upon land did not constitute occupation, and that actual, physical occupation of the land under the provisions of section 54 of the public-land act is necessary to prove possession. With reference to paragraph 6 of section 54 of the public land act, it may be stated that there are many persons in the islands who lay claims to immense tracts of land which they have never owned, and who know that their only proof of occupation is that the said land has been used for pasturage purposes. However, they make their applications before the court of land registration under this paragraph, and unless strenuous opposition is maintained they may secure title. This appears contrary to the spirit of the law and it is believed not to have been the intention thereof, as it does not encourage agriculture, but gives control of large tracts of land to those who allow them to remain idle to the exclusion of applicants who, if they were permitted to take up said lands under the public land act, and cultivate them, would do so. This provision of law also tends to the extension of caciquism, and prevents small holders from obtaining possession of the land by them occupied. It is suggested that an amendment to this section, to the effect that the land shall have been cultivated, would not cause injustice, and deserving persons who apply for registration under the benefits of this chapter, as well as the government, will have their respective interests safeguarded.

Sections numbered 58 and 66.—In the last annual report it was anticipated that this bureau would be delayed in the work of surveying under the provisions of section No. 66. This prediction has come true, and complaints are heard of the inability of this bureau to keep up with its surveys. During the year there have been 109 surveys under the provisions of this section at a cost to the government of ₱10,825, or an average of about ₱100 each. There are upward of 1,000 cases now pending in the court of land registration which must, as soon as decreed, be surveyed by this bureau at government expense, before final decree can issue. If the cost of said cases averages anywhere near the cost of the cases already surveyed, the cost of cases now pending will be ₱100,000, which is an item of great importance, especially when it is considered that it will be a constant, increasing expense in the future. On the other hand, during the year, at the applicants' request under section 58 of the law, there were made 60 surveys costing ₱3,041.72, averaging about ₱50 each survey. The reason for the difference in the cost of these surveys under the different chapters is the fact that where the applicant applies for a survey and pays for same he wants it done at the cheapest rate possible, is willing to subsist the surveyor, furnish him labor, clear the boundary lines, furnish material, and possibly construct the monuments, and in every way assist the surveyor to reduce the amount of his work and the length of his stay on the property. On the contrary, under the provisions of section No. 66, a surveyor has difficulty in even getting the owner to point out his boundaries and can obtain no assistance from him in any way, as, under the provisions of section No. 58, the survey is at government expense. Notwithstanding the fact that the owner must obtain some kind of a survey of his property before it is presented to the court (and it is reasonable to presume that if he could obtain same he would prefer a survey by the bureau of lands which would be official when presented to the court), it is now absolutely impossible for this bureau, with the small force of surveyors authorized, to do the work. This enormous expense to the government should be stopped immediately, and the most reasonable solution of the situation which this bureau can suggest is that the bureau be authorized to employ a sufficient number of surveyors to thoroughly cover the islands—say, one or more in each province, as the work demands—such surveyors to do the work under the provisions of section No. 58. By such a method, not only would the government save the entire expense of the surveys as now made, but the property holders would save at least a considerable percentage of the high price now paid to surveyors in private practice, whose surveys and plans are, in most instances, absolutely worthless. Another reason why some means should be adopted to stop the expenditures by the government for section No. 66 surveys is that there is no just cause existing for expending large sums of

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money from the general treasury for the benefit of a comparatively few individuals. Neither do the property holders desire surveys under section No. 66, even though it causes them no extra expense, as it involves a delay in securing their title, and they have already paid a high price for the plan of their land which they present to the court. It is believed that the theory of the framers of this section of the law was that section No. 66 surveys would segregate government from private land. This perhaps is the case in a small percentage of the surveys, but it does not appear that this small number of cases warrants the expense in surveying a much larger percentage where no government lands adjoin. It is estimated that not over 5 cases in 100 are bounded by government lands. If the work of the court of land registration proves a success, instead of 1,000 cases per year the result should be 5,000 per year decreed under the provisions of this section, and the cost for surveys would approximate ₱500,000 each year. Therefore it is proposed that if it is not feasible to increase the personnel of this bureau for this purpose, the bureau be authorized to expend funds received for surveys made under section No. 58, for the payment of the personnel and expenses for further surveys under this same section of the law. Thus the bureau would be unrestricted by being confined in this survey work to the personnel authorized by the appropriation acts, and could employ surveyors and pay their expenses from funds received from the work they perform. As this bureau charges 10 per cent over and above the cost of such work, and as it would be possible to do a great amount of this work if the authority were obtained, it is reasonable to believe that this solution of the problem would be a successful one.

MINERAL AND MINING CLAIMS ON PUBLIC LANDS UNDER THE MINERAL LAW OF THE PHILIPPINE ISLANDS.

Coal claims.—During the past fiscal year 136 coal entries have been recorded in this bureau, covering an area of 8,156 hectares, in addition to 150 entries covering an area of 9,139 hectares filed previous to this fiscal year, making a total of 286 coal entries to June 30, 1907, with an area of 17,295 hectares. Details of the status of these entries are shown in the statements submitted herewith [on file in the Insular Bureau], including the provinces in which claims are located. During the past fiscal year 143 entries that were pending action at the close of the previous fiscal year were canceled, as the applicants failed to complete their entries within the year. Two entries have been perfected, patent issued, and ₱12,800 received for same. Of the 136 entries filed during the past fiscal year, 18, covering an area of 1,052 hectares, are undergoing survey. The coal of the islands is now being seriously considered by railroad companies and other corporations, and from present indications it is believed that several of the entries will be perfected during the coming year. It may be said that a majority of the entries to date have been of a speculative character, and the parties filing such entries have had no intentions nor resources to secure final patent. There have been also some of the claims dating from the first years of American occupation presented for opinions as to their validity. These claims, aside from having no legal value, are the results of questionable proceedings, and the opinion of this office has been rendered accordingly. Applications have been received for 18 coal-land surveys, which have been ordered.

MINERAL AND MINING CLAIMS OTHER THAN COAL.

Prior to the last fiscal year it was impracticable to definitely state the number of mines and mineral claims located in these islands, in view of the fact that provincial secretaries acting as mining recorders failed to render reports. Therefore this report treats of all claims located since the enactment of the mining law in 1902. During the past year there were 427 lode and 92 placer claims filed throughout the islands, while prior to the beginning of the fiscal year there were 1,174 lode and 441 placer claims filed—making a total of 1,601 lode and 533 placer claims filed to June 30, 1907. There is submitted herewith a detailed statement of all mineral and mining claims filed in the Philippine Islands since the enactment of the mining law to June 30, 1907, showing the kind of claim, the minerals, and the province where located.[a] During the year 13 mineral patents have been applied for, none of which has as yet been accomplished. Twenty-one applications for survey by this bureau have been received, and as these are about completed it is anticipated that patents will issue immediately. That minerals, in quantities sufficient for the industrial success of

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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mines, are to be found, has heretofore been somewhat in doubt, but experience during the past year has demonstrated that gold mining will be one of the successful industries of the Philippine Islands.

Up to the present time the provincial secretaries or their successors (who in many instances are the governors of the various provinces) have been acting as mining recorders. While this is satisfactory in the matter of the recording of mining claims, it is not satisfactory when an application for a patent is made, as the recorders, in many cases, do not know how to proceed, and it is necessary for this office to give specific instructions in each case, as it is essential that a critical examination be made of all papers in an application for a mining claim before a patent can issue, and that all documents should be legally in compliance with the terms of the mining law, and such an examination can only be made in this office. It is therefore believed that further experience will demonstrate the necessity of designating the local land officer in each province as mining recorder.

SURVEYING AND DRAFTING.

During the past year the division of surveying and drafting has accomplished the survey of 17,168 parcels of land, containing an area of 68,573 hectares, at a cost of ₱211,563.59. The average area of each parcel surveyed was about 4 hectares and the average cost was ₱12.32 per parcel, or about ₱3.08 per hectare. These figures, however, do not include the cost of computation, drafting of plans, tracings, or furnishing of blueprints for each parcel, except in a comparatively small number of cases—say, 2 per cent of the whole number—but does include the cost of location and erection of monuments for reference purposes.

At the close of the fiscal year the technical force of employees available for surveying and drafting purposes consisted of 26 classified and 24 unclassified, or a total of 50 employed, while there were 75 authorized positions. The dearth of available men to fill surveyors' positions naturally delayed the work undertaken, but the vacant positions were filled as fast as candidates were available, and every effort was made until, at the close of the fiscal year, there were 44 classified and 31 unclassified employees engaged in this work, every position being filled by men having some qualifications, and it is estimated that the entire force employed in this division had an efficiency of about 80 per cent in results produced, compared with what a qualified force would have accomplished. However, the gain during the year of 18 surveyors in the classified service is gratifying and better results will be forthcoming in the year to come. Two Filipino surveyors have qualified in the civil-service examinations, but all of the rest of the technical force used in surveying is American. An increase of force in this division is considered essential during the coming year by the addition of 10 surveyors, 10 computers, and 11 draftsmen, in order to undertake the work already accumulated. This increase is not due to the Friar lands surveys, but to the large number of public land and mineral surveys. Town-site surveys have been ordered for Parang, Sibul Springs, Baguio, Jolo, Malaban, Olongapo, and Dansalan. Surveys of 12 reservations of public lands, 60 lode claims, 20 coal claims, and 10 placer claims have also been ordered. It is also estimated that 400 surveys under section 66 of the public land act will be ordered by the court of land registration, and that 200 surveys under the provisions of section 58 of the public land act will be applied for. In addition 24 lease and 2 sales surveys of public lands are pending, and there are further applications on file for public lands which will require survey. There are pending, under the free-patent chapter of the public land act, over 6,000 free-patent entries which require surveys, and it is estimated that approximately 1,000 such surveys may be completed during the year. It is also hoped to begin the monument and road location surveys, whereby it is expected to locate in each town two monuments, determine the location thereof with reference to the surveys made by the coast and geodetic survey, connecting same with surveys along the roads from town to town in such a manner that the location of properties surveyed in the future may be definitely determined, as in the past ordinarily land surveys have not been tied to any determined monument.

The work of the division naturally falls under the following subheads, and will be so considered: Friar land surveys, public land surveys, drafting, computations, and student surveyors.

FRIAR LAND SURVEYS.

During the past year there have been surveyed 62,239 hectares on the friar estates, making a total area surveyed to date of 95,528 hectares; leaving 63,144

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hectares to be surveyed during the coming fiscal year, in conformity with the plan approved by the Philippine Commission at the beginning of the fiscal year 1906 for the completion of the friar land surveys within two years. To accomplish this purpose it will necessitate 10 parties, each with a chief and 3 transit men, 1 cook, 1 draftsman, 3 sketchers, 6 chain men, 12 rodmen, and about 20 laborers, and dispositions have been made accordingly.

The computation work on the friar land surveys has been delayed by the lack of qualified men, but it is hoped with the aid of mechanical computers and additional employees to make up for the delay during the following fiscal year.

The following statement shows a summary of the work accomplished on parcel surveys of the friar lands estates during the fiscal year, and the cost per hectare surveyed.[a] Such cost, however, does not include computations nor drafting.

This statement shows that the cost of surveying ranges from ₱0.52 to ₱7.31 per hectare, or an average of ₱3.09, including the Isabela estate, where the parcels were uniform in size and of large area. If the average for this estate is excluded, the cost may be stated at ₱4.30 per hectare, which is about the average cost of making such parcel surveys. The high cost per hectare of surveying which the statement shows on the Banilad estate is due to the changes in the personnel, to resignations, and the necessity of breaking in new men, to the cost of transportation to and from the estate, and to the fact that the party has been broken up for other surveys in its vicinity on different occasions; while the high cost shown of the Orion estate includes the cost of computation. Wherever the cost is shown as exceeding ₱5 per hectare, it has been necessary to make changes of chiefs of parties and to use inexperienced men in this work, and it may be stated that during the coming year, as the surveyors gain in experience, the cost per hectare for the work will decrease. The size of the parcels on an estate also affects the average cost per hectare on that estate—for instance, on the Calamba and Imus estates, each, having large parcels formerly cultivated in sugar, shows a cost for surveying below the average; while the estates, devoted to the culture of rice, and having many barrio and town lots of small dimensions and very few large farm lots, show a cost per hectare above the average. The size of the survey party also affects the cost, it having been demonstrated that a party of the size mentioned herein as necessary to complete the friar land survey in a year has been the most economical.

It has been impossible, up to the close of the year, to begin the surveys on the Santa Cruz de Malabon, Tala, Piedad, or the Talisay-Minglanilla estates. However, work will be begun on two of the estates during the month of July, and with the increased provision for surveyors which is expected during the coming year, work on all the estates will have been begun before September 1. The following statement shows the balance of the work to be done on friar land surveys, and the estates on which surveys are incomplete:

AREA OF PARCEL SURVEYS TO BE MADE ON FRIAR LAND ESTATES DURING THE FISCAL YEAR 1908.

Estate.	Total area.	Percentage of area to be surveyed.	Area, hectares, to be surveyed.
San Francisco de Malabon	11,449	47.2	5,266
Tala	6,696	100.0	6,696
Piedad	3,860	100.0	3,860
Muntinlupa	2,827	40.1	1,030
Talisay-Minglanilla	8,020	100.0	8,020
Imus	18,243	47.3	8,686
Calamba	13,673	50.5	6,912
Lolomboy (Bocaue parcel)	4,901	31.7	1,514
Naic	7,624	52.1	3,960
Santa Cruz de Malabon	9,795	100.0	9,795
Santa Maria de Pandi	10,342	71.7	7,405
Total, on 11 estates			63,144

Brought forward, area to be surveyed, 63,144 hectares.

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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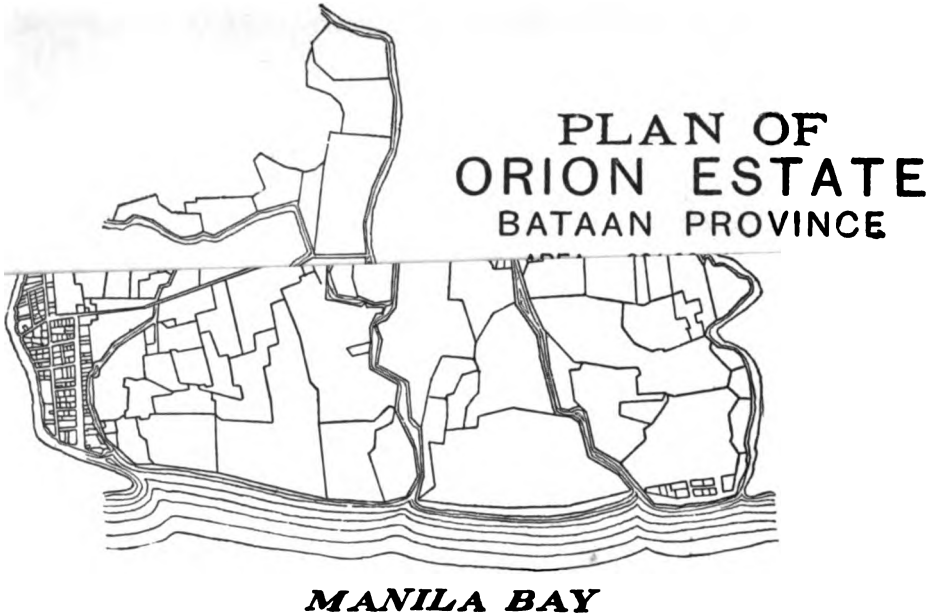

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Survey to date.	Hectares.
San Jose estate, fiscal years 1905 and 1906	23,266
Isabela estate, fiscal years 1906 and 1907	19,891
Other estates reported, fiscal year 1906	10,026
Other estates reported, fiscal year 1907	42,348
Total friar lands surveyed to date	95,531
Total area friar land estates	158,675

In order to illustrate the amount of work necessary in the survey of a friar lands estate, the following plan of the Orion estate in Bataan Province is submitted, showing the parcels as surveyed. This estate covers an acre of 901 hectares, and is divided into 651 lots, an average of 1.38 hectares to each lot. Attention is invited to the irregularity in the size and shape of the lots, the numbers of sides and corners, and the fact that most lots have banana, bamboo, mango, or other trees, or rice dikes along their boundaries in such a manner that any attempt to change the boundaries or square the lots meets with the objections of the tenants. Thus it has been found impracticable to survey this estate in regular or rectangular parcels, or, except in a very few instances, to change the boundaries of parcels. This condition has made surveys more expensive than they would otherwise be on all friar lands estate which are occupied.

PUBLIC LAND SURVEYS.

The public-land surveys completed during the year are shown in the following statement, which also includes the area, the total cost, and the cost per hectare:

SUMMARY OF COST AND NUMBER OF PUBLIC-LAND SURVEYS EXECUTED BY BUREAU OF LANDS DURING FISCAL YEAR 1907.

Class of survey.	Number of surveys.	Number of parcels.	Area.	Cost.	Cost per hectare.	At cost of—
			Hectares.			
Section 58, act No. 926	46	60	1,608.62	₱3,041.72	₱1.89	Applicant.
Section 66, act No. 926	92	109	3,795.52	10,825.09	2.85	Government.
Mineral claims (lode)	12	12	94.72	1,793.88	18.94	Applicant.
Leased land	1	1	31.00	125.00	3.31	Do.
Town site (subdivision)	1	48	71.47	1,680.47	23.51	Government.
Town site (boundary)	1	1	25.00	703.16	28.13	Do.
Civil reservations	5	5	685.64	610.57	.89	Do.
Government lands	1	1	.09	50.00	555.55	Do.
Private lands	1	1	21.28	33.40	1.57	Do.
Total	160	238	6,334.33	18,863.29	2.98	

In addition to above-mentioned surveys completed as per statement, there were 17 mineral surveys made by deputy mineral surveyors, in which this bureau prepared the plans and final notes, collecting therefor ₱50 per survey, and there are 12 such surveys pending. The following surveys are in various stages of progress, and estimated to be 75 per cent completed:

SURVEYS ORDERED AND FIELD WORK COMPUTATIONS AND PLANS PENDING COMPLETION JULY 1, 1907.

Section 58, act No. 926	9
Section 66, act No. 926	82
Mineral (lode)	21
Mineral (coal)	21
Leased land	9
Sales applications	3
Town site (subdivisions)	1
Civil reservations	7
Free patents	383
Total	536

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Surveys made under the provisions of section 58, Chapter VI, of the public-land act, are made at the expense of the applicant. This subject is treated of in connection with the report on public lands, "Unperfected titles," together with the subject of surveys under section 66 of the same act. The following statement shows the number of surveys made under section 58, the areas, provinces, cost, etc.:

Province.	Number of surveys.	Number of parcels.	Area.	Cost.	Cost per hectare.	At cost of—
			Hectares.			
Albay	2	[illegible]	[illegible]	[illegible]	[illegible]	Applicant.
[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	12	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	21	[illegible]	[illegible]	[illegible]	1.18	Do.
[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	2	[illegible]	[illegible]	[illegible]	1.63	Do.
[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	Do.
[illegible]	1	1	[illegible]	[illegible]	4.[illegible]	Do.
Total	[illegible]	[illegible]	[illegible]	[illegible]	1.[illegible]	

[illegible] made under the provisions of section 66, Chapter VI, of the public [illegible] at the expense of the government. The following statement [illegible] number of surveys made under [illegible] during the year, the [illegible] and those made under section 58 at cost of applicant, made [illegible] under the [illegible] exceptions that appli- [illegible] case, while in the other case almost no [illegible] in some instances the [illegible] of the applicants [illegible] has often caused delay.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	At cost of—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Government.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Government.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

[illegible] shows [illegible] better

The following statement shows the surveys not otherwise reported which were made during the year:

Class of survey.	Number of surveys.	Number of parcels.	Area.	Cost.	Cost per hectare.	Province.
			Hectares.			
Lode claim	12	12	94.72	₱1,793.88	₱18.94	Sorsogon.
Leased land	1	1	31.99	125.00	3.91	Bataan.
Government land	1	1	.09	50.00	555.55	Manila.
Town site subdivision	1	48	71.47	1,680.47	23.51	Benguet.
Civil reservation (Egbert and Stotsenburg monuments)	2	2	1.99	50.00	25.13	Bulacan.
Civil reservation (school)	1	1	8.09	206.97	25.58	Isabela.
Do	1	1	17.71	6.00	3.34	Sorsogon.
Do	1	1	657.85	347.60	.53	New Ecija.
Private land	1	1	21.28	33.40	1.57	Rizal.
Town site (boundary)	1	1	25.00	703.16	28.12	Bulacan.
Total	22	69	930.19	4,996.48	5.37	

Very few applications for mineral surveys have been made during the year, and wherever possible such surveys have been referred to deputy mineral surveyors, three of whom, after filing bonds, were appointed during the year, and have completed 17 surveys which have been accepted by this bureau. The bureau makes a charge of ₱50 each for checking, platting, and preparing field notes. These deputy mineral surveyors are compelled to conform to instructions issued by this bureau relative to mineral surveys, and although this caused them considerable trouble in the beginning, it is absolutely essential in order to obtain accurate surveys of mineral claims. The cost of mineral surveys made by this bureau was ₱18.94 per hectare.

Other public land surveys that are mentioned in the statement above are so few that as yet no general idea can be obtained of the cost thereof. On the completion of those stated as incomplete, the relative cost of the different classes of public land surveys may be obtained.

The work on free patent surveys which has been undertaken in Benguet Province has been done in combination with an accurate topographic survey which has been completed of the entire Agno River Valley and parts of the Trinidad and Naguilan valleys. Numerous points have been checked by triangulation and the topography roughly sketched by contours. The main trails between Baguio and the Agno River have been surveyed and reference monuments have been established in every barrio where the surveyor has been at work. A final map of about two-thirds of the entire province of Benguet will be completed during the coming year.

Further subdivision of lots in the Baguio town-site reservation is being made with a view to another sale as early as possible, which will consist of 20 lots in Section A and 19 in Section F. A survey party has also been at work for some weeks upon the Sibul Springs town-site reservation.

The following applications of public land surveys are pending: Seventy-five under section 58, act No. 926; 56 under section 66, act 926; 3 of leased land; 13 on sales application; 4 town site; 3 civil reservation, and as many as it is possible to make during the year on free patents granted, there being over 6,000 applications now on file. There have also been allowed 748 homestead grants on which surveys will be necessary in the future. It is estimated that there are now surveys sufficient to keep 13 parties in the field during the year, not including applications that are expected to be filed during the year.

DRAFTING.

There has been no attempt to segregate the cost of drafting from that of computation, except the total cost of drafting and computing for each separate survey. However, it appears necessary to keep such cost entirely separate, and during the coming year such records will be kept of the time consumed, so as to segregate the cost of drafting and computing separately for each survey. The amount of drafting done has been greatly increased, and blank forms for final sheets, tracings and final notes have been adopted for each different kind of survey, so that uniformity will prevail, and that, wherever possible, the legends and certificates may be printed, thus saving the time of the draftsman.

Nine hundred and ninety triangulation points throughout the Philippine Islands, located by the coast and geodetic survey, have been platted upon poly-

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conic projection sheets, at the scale of one inch to the mile, and also the coast line, wherever it has been determined by the coast and geodetic survey. It is proposed to continue this work, as accurate surveys are made, notes of which will be obtained either from the coast and geodetic survey, or from the surveyors of this bureau, which will finally result in a map of the Philippine Islands on this scale. The boundary lines of some 30 large haciendas scattered throughout the islands have also been obtained, but until some connection can be established between the triangulation points of the coast and geodetic survey and some point on the boundary of each hacienda, they can not be accurately platted upon these sheets.

COMPUTATIONS.

Computations during the year have been made almost entirely by surveyors prior to their entering the field service; thus a new surveyor or transit man, on being employed, was usually kept in the office for two or three months, until he became thoroughly conversant with the methods of the office work, during which time he was used on computation work. Thus constant changes of computors has occurred, which has delayed the work upon computations on the surveyed friar lands. However, provisions have been made for a permanent force of computors during the coming year, and this, together with the fact that it is expected to use mechanical computors for portions of the work, will, if successful, reduce the cost thereof.

Student surveyors have been used on computations wherever it has been possible, but it has been found absolutely necessary to have two entirely separate computations made, and upon completion thereof compare same for a check upon the accuracy of the work.

STUDENT SURVEYORS.

Under the provisions of act No. 1491 there was started in this bureau at the beginning of the last fiscal year a class of Filipino student surveyors. When this act was passed it was understood that there were students in the schools of the islands who were qualified for certification under said act, but during the year there were only 6 students so certified by the director of education, and two of said students dropped out of the class before the close of the year. All the students certified were from the nautical school, and it is believed they were students who were unable to keep up with their classes in that school. It was found necessary to give them instructions in both algebra and geometry, for until a student is well advanced in these two subjects he can assimilate only a limited amount of instruction in theoretical surveying, and that must be of the most elementary character. Four of the students remained with the bureau throughout the year, spending their afternoons and Saturdays on computation and practical work, and at the close of the school year were sent into the field with regular survey parties. They were reported to be interested in their work and eager for instruction, and since their return their class work shows marked improvement.

In order to obtain qualified students for the present year, recommendation has been made that students who have completed the second year in the public high school be certified as student surveyors. This lowers the standard for entrance and will necessitate a longer course of study in the bureau. Under this provision 12 second year high school students have entered the class and appear to be better qualified than the students received from the nautical school last year. These students now, instead of attending the school of arts and trades, are attending the class in the Manila high school, were it is expected the course will be continued throughout the year.

The 4 students who completed last year's work failed in their examinations and will therefore be required again to go over the work of the first-year student with the new class. While it is to be regretted that the class was not more of a success during the year, the failure may be said to be due to the fact that qualification for entrance was such that there were no available candidates, the public school not having qualified its students sufficiently in mathematics to take up the work of theoretical surveying.

SAN LAZARO ESTATE.

In the reports of this bureau for the fiscal years 1905 and 1906, considerable attention was given to the poor condition of the public streets on the San Lazaro estate, the lack of proper drainage, and the inadequacy of the water supply, the street lighting system, and the sanitary arrangements. Recommendations were made tending toward a correction of these conditions. A further discussion of this subject would only be a repetition of former reports, and all

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that need be said is that the general conditions therein described remain unchanged. The attitude of the municipality is one of unqualified opposition to any plan involving the expenditure of its funds upon improvements in this district. This bureau has endeavored to arrange for the extension and improvement of streets, water mains, and light circuits without success, and has endeavored to have the sweepings from the streets of the city dumped into the so-called streets of the San Lazaro estate, in order that, for lack of more suitable material for street construction, the unfortunate residents of this district might at least have the benefit of this small improvement, but even this request has been refused by the city of Manila. The attitude of the city authorities is such that so long as the government refuses to pay taxes on the property no improvement of the streets need be expected. This is an anomalous condition of affairs, retarding the development of the estate and not considered justifiable, and it is suggested that if the city were compelled to pay its share of the expense of caring for the lepers picked up within its limits—approximately 200 at ₱0.75 per diem, say ₱150 per day—the attitude of its authorities might be changed.

The entire San Lazaro estate has now been subdivided into 116 blocks, exclusive of the hospital reservation. Of these, 73 have been surveyed and subdivided into building lots, 10 have been partially subdivided, 22 suitable for building purposes remain to be surveyed and subdivided, and 11 are so situated that the lands are only suitable for agricultural purposes and can not be used for building sites. The condition of the streets at present will probably delay the completion of this work, as some blocks are absolutely unapproachable during the wet season. Subdivision of this property is necessarily slow, as the greater parts of the lands are occupied, and after the survey has been completed reassignment of the lands and the removal or rearrangement of buildings are necessary. Some of the lands have been used for truck gardening purposes, and in each case it is necessary to allow the tenants time to harvest their crops before changes are made. However, it is estimated that surveys of all blocks suitable for building purposes will be completed within the first half of the coming fiscal year.

An attempt has been made to increase the number of tenants on the estate by advertisements which have been published in the daily papers of the city with some success; but as the majority of the tenants are not readers of newspapers and the demand for lots within the zone of strong materials is not great on account of the lack of funds to erect buildings, no great progress has been made in thus obtaining new tenants.

There are at present 2,629 lots occupied, of which 354 correspond to the old plan of the estate. There are 493 lots vacant in the new subdivision, the majority of which have been recently surveyed and are being rented by new tenants. When lands in the old subdivision become vacant they are not rerented until surveyed under the new plan, but the total area of such lots is now comparatively small. During the year 277 tenants were added to the rent roll, occupying 425 lots. There are now 1,693 tenants at will, 35 holding under six-year leases, and 6 holding leases for longer periods; or a total of 1,734 tenants on 2,629 lots leased.

The rearrangement of the houses into systematic block formation has greatly improved the general appearance of the estate. The individual tenant takes more interest now than formerly in keeping his home in good repair and in making additions to his buildings. Telephones are coming into use, and water and light connections are now found in some of the houses, even in the nipa district. A large percentage of the houses which a few years ago were not subject to taxation on account of their trifling value have been repaired and enlarged, until they have become taxable at a considerable valuation.

During the year this bureau authorized the construction of 20 buildings of strong and 149 of light and mixed materials. Repairs and additions were also authorized upon 23 buildings of strong and 544 of light and mixed materials. The new Methodist Episcopal Church in course of construction at the corner of Calles Cervantes and Lope de Vega is a handsome building, which adds greatly to the appearance of the neighborhood. The bureau of prisons has begun the construction of an additional wall to inclose the site of a new prison hospital, soon to be constructed. The land which these improvements will occupy belongs to the estate.

During the fiscal year 1907 the total amount of rentals received from the estate was ₱53,467.37, as against ₱50,243.75 for the preceding fiscal year—an increase of a little more than 6 per cent.

The delinquent rent roll on June 30, 1907, amounted to ₱2,339.59, all of which should be collected within a few months.

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The most successful method for the collection of rents seems to be that now in operation—the monthly house-to-house inspection demanding payment. These repeated demands eventually have the desired effect, but occasionally suits in ejectment have to be filed against the habitual delinquents, with the usual result that both rent and court costs are lost, through the fact that there is nothing with which to satisfy the judgments. During the past year very few ejectment cases were filed, but a number of complaints are now being prepared which will be filed within the ensuing month.

STATEMENT SHOWING RECEIPTS AND EXPENDITURES SAN LAZARO ESTATE, FISCAL YEAR 1907.

RECEIPTS.

Rents received for the period July 1, 1906, to June 30, 1907	₱53,467.37

EXPENDITURES.

Salaries, office force	₱5,088.43
Salaries, field party	2,090.42
Unrecovered court costs	740.64
Incidental expenses	1,246.69
Total cost of administration	9,166.18

Before this property can reach the highest point of financial productiveness, the public streets must be put in good condition, water mains must be extended to afford ample fire protection, the property must be drained and the electric-light lines must be extended. I recommend that all lands which the Commission ordered reserved for the extension and improvement of streets be formally conveyed to the city of Manila, free of all cost, but with the express agreement that the municipality shall, within the next two years, at its own expense, make the public improvements necessary for a good street system, the total cost of which shall not be less than the assessed value of the lands so conveyed. There is submitted herewith a plan showing the subdivision of the estate to June 30, 1907.

FINANCIAL STATEMENTS.

The following statements show the receipts and expenditures of the bureau of lands for the fiscal year 1907, segregated under the proper subheads. The first statement of expenditures as herein submitted shows the expenditures as made. The second shows the expenditures as assigned to the three natural divisions of this bureau—public lands, friar lands, and San Lazaro estate—the general office being charged merely with furniture, fixtures, and equipment, the cost of which can not properly be charged to any of the subdivisions mentioned, and the cost of lands purchased.[a]

In conclusion your attention is invited to the fact that the expenditures of the bureau for the last fiscal year, ₱473,416.14, compared with the expenditures of the previous year, ₱241,436.88, show a very large increase, due mainly to the increase in the surveying and drafting force necessary for the completion of the friar-land surveys and for public land surveys. A further increase in this class of expenditures will occur during the coming fiscal year, and it is anticipated that the full force of surveyors and draftsmen authorized will be employed and the probable expenditure by the bureau will exceed ₱600,000. Thereafter either this figure will be materially reduced or the collections will be greatly increased.

The total revenues of the bureau have also increased from ₱165,975.51 for the fiscal year 1906, to ₱282,620.14 for the fiscal year 1907, and a still greater increase is probable for the fiscal year 1908, both in receipts from public lands and from friar lands. This bureau does not now include in its actual receipts the amounts received from the San Lazaro estate, which are collected by the collector of internal revenue, and which, if included in the 1907 receipts, would increase the same to ₱336,087.51.

Respectfully submitted.

C. H. SLEEPER,
Director of Lands.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

[a] A statement of receipts and expenditures has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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APPENDIX F.

REPORT OF THE ACTING DIRECTOR OF AGRICULTURE.

MANILA, P. I., *August 14, 1907.*

SIR: I have the honor to submit herewith my report as acting director of agriculture for the fiscal year ended June 30, 1907.

ORGANIZATION.

The organization includes the three divisions: Administrative, plant industry, and animal industry.

ADMINISTRATIVE DIVISION.

The work of the administrative division includes the general administration of the central office of the bureau in Manila and of outlying experiment stations and stock farms; also such special lines of work as publications, crop reporting and statistics, steam plowing, etc., which do not properly come under the divisions of plant and animal industry.

PERSONNEL.

The director of agriculture was granted leave of absence with permission to return to the United States, and sailed from Manila on March 19, 1907.[a] Since that time the assistant director has been performing the duties of the director, including the submission of this report. On account of this fact the matter herein contained will probably not be as full and explicit on certain questions which were handled entirely by the director as it otherwise would have been.

Some difficulty has been experienced in keeping the working force up to the desired standard. The meat-inspection law went into effect in the United States last year, the entrance salary of veterinarians was raised from $1,200 to $1,400, and there was a great demand for veterinarians of all grades on account of the increased number of positions. This affected the bureau of agriculture to the extent of taking away the entire veterinary force, except three men, in its employ one year ago. Every effort has been made to fill the vacancies, but so far only five veterinarians have been induced to come out from the United States. Cable advice has been received from Washington that only three additional veterinarians are available for appointment. The salaries offered by this government would appear to be adequate, but the very bright business outlook in the United States, the ease with which veterinarians secure employment in the Bureau of Animal Industry, and the handsome returns secured by private practice all combine to prevent men of this profession from coming to the Philippines.

The six agricultural inspectors provided for in the appropriation for the current year were appointed, and arrived here during the months of November and December, 1906. They were given a preliminary period of instruction in the work which they were expected to perform in the provinces, especially in the suppression of infective animal diseases, and assigned to their several stations about January 1.

It seems very desirable to increase the number of veterinarians, inspectors, and assistant inspectors, so that there shall be at least one veterinarian, inspector, or assistant inspector for each province and important island in the archipelago. It is imperative that those who are sent to suppress outbreaks of infective animal diseases arrive on the spot promptly before the disease has

[a] The resignation of Prof. W. C. Welborn, director of agriculture, was cabled from Washington July 18, and accepted effective June 3, 1907.

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had time to spread, and the nearer the man is to the location of the outbreak the easier it becomes to reach there promptly.

A requisition was placed with the bureau of civil service on March 23, 1907, for a stenographer at ₱2,400 per annum. This addition to the clerical force has seemed imperative, and yet we have been advised month after month that no additional stenographers were available. This probably indicates that the salary offered is too low, and that we shall have to increase the pay or fill the position with a lower grade employee.

It is necessarily a difficult matter to secure from the United States persons who are qualified to enter at once into active service in tropical agriculture. In this connection the assistance and cooperation of the bureau of civil service has been of great value.

The native clerical force is increasing in efficiency year by year, and it now seems probable that this branch of the force can be increased and the number of higher priced American employees gradually decreased, thereby economizing in the cost of clerical work. It is recommended that a number of native clerks heretofore working as temporary employees be appointed permanently in the classified service.

The year shows a net loss of five classified employees.

PUBLICATIONS.

During the year the following publications have been issued:

Title.	Author.	Issued.	Language.
FARMERS' BULLETINS.			
No. 13.—El Cultivo del Maguey en las Islas Filipinas (reimpreso).	H. T. Edwards	Aug. 27,1905	Spanish.
No. 14.—El Cultivo del Sesamo en las Islas Filipinas.	Wm. S. Lyon	Aug. 29,1906	Do.
PRESS BULLETINS.			
No. 8.—Maguey, Propagating Abaca from Seed, etc.	H. T. Edwards	Nov. 9,1906	English.
No. 9.—Bureau of Agriculture Districts of the Philippines, Control of Rinderpest, etc.	G. E. Nesom	Feb. 5,1907	Do.
No. 10.—The Weevil Pest and Its Remedy, Maguey, etc.	H. T. Edwards	Apr. 24,1907	Do.
No. 10.—La Plaga de Gorgojos y su Remedio, Maguey, etc.	do	do	Spanish.
CIRCULARS.			
Instructions for Planting Field and Garden Seeds.	Wm. S. Lyon	July 19,1906	Do.
Maguey	H. T. Edwards	July 27,1906	English.
Do	do	do	Spanish.
Do	do	do	Ilocano.
Do	do	do	Tagalog.
Do	do	Sept.12,1906	Bohoiano.
Do. (reprint)	do	do	Tagalog.
Do. (reprint)	do	do	Spanish.
Do	do	Nov. 8,1906	Masbate.
Do	do	Apr. 24,1907	Cebuano.
Do. (reprint)	do	May 16,1907	English and Spanish.
No. 1.—Crop Reporting Service	do	Nov. 11,1905	Spanish.
Do	do	do	English.
Instructions for Planting Field and Garden Seeds (reprint).	Wm. S. Lyon	Mar. 19,1906	Spanish.

There is a constantly increasing demand for publications on agricultural subjects and extensive distributions of our bulletins have been made within the year.

Our press bulletin has grown to such proportions that with the addition of the statistical division and crop-reporting service it might well be further enlarged into a monthly publication, to be issued and circulated as a periodical.

The circular on maguey was published in the languages of those provinces and islands where existed the greatest interest in this subject. This circular has accomplished excellent results, and it is safe to say that of all the crops gen-

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erally advocated for the Philippines none has created up to this time the same interest that has been manifested in maguey. This fact has suggested the desirability of issuing similar circulars on such other subjects as kapok, corn, rice, pineapples, cacao, and sesamum, and all of the infective animal diseases prevalent in the islands.

The mailing list of the bureau has been revised, so as to avoid sending bulletins and other publications to persons who would not receive and make good use of them.

Crop Reports and Statistics.

ORGANIZATION.

In the annual appropriation for the current fiscal year provision was made for a statistician, whose duty it should be to organize and give constant supervision to a crop-reporting service throughout the islands, and so record and classify the statistics thus obtained that they should be available for reference and publication.

On October 1, 1906, Mr. B. L. Moss was appointed to this position, and began at once the organization of the work. On October 29 he presented a report and recommendation to the director of agriculture in which a proposed plan of organization was given. The proposed work of this division, briefly stated, was to obtain regular and reliable information relative to crops and live stock in all parts of the islands; to summarize and tabulate this information so that it may be in the highest degree useful and available, and to publish such part thereof as may seem desirable.

In order to obtain the information required it was proposed to organize a crop-reporting service with a corps of municipal, provincial, and district reporters, the latter to be our agricultural inspectors, who were also to have a general supervision of the work of all other reporters. Each one of these reporters was to funish a regular monthly and annual report on the agricultural conditions within his municipality, province, or district, to be made out on forms furnished by this bureau. This service, except in the case of our regularly appointed inspectors, was to be gratuitous. The crops to be reported upon were abaca, maguey, sugar, rice, copra, and tobacco. The information to be furnished regarding these crops included the area planted and harvested, condition and value of crops, etc. The live stock to be reported upon included horses, cattle, carabaos, goats, sheep, and hogs. The information to be furnished regarding live stock included the number and condition of animals, increase and decrease, number of cases of disease, and nature of disease.

BUREAU OF AGRICULTURAL DISTRICTS.

It had been planned to divide the entire archipelago into districts, in each of which should be stationed at least one veterinarian and one agricultural inspector or assistant inspector. It was arranged that, when opportunity permitted, the representatives of this bureau, especially the agricultural inspectors, should employ their time in personally organizing and supervising the crop reporting service.

The bureau of agriculture has established nine agricultural districts, including all provinces and important islands, as follows:

District No. 1.—Cagayan, Isabela, and Nueva Vizcaya; headquarters, Tuguegarao; substation, Ilagan.

District No. 2.—Ilocos Norte, Ilocos Sur, and La Union; headquarters, Vigan; substations, Laoag and San Fernando (La Union).

District No. 3.—Pangasinan; Benguet, Lepanto-Bontoc, and Tarlac; headquarters, Dagupan; substations, Baguio, Cervantes, and Tarlac.

District No. 4.—Zambales, Bataan, Pampanga, Nueva Ecija, La Laguna, Rizal, Manila, Cavite, Batangas, Tayabas (part on west coast), Mindoro, Palawan, Marinduque, Romblon, and Bulacan; headquarters, Manila; substations, Iba, Lamao, San Fernando (Pampanga), San Isidro, Batangas, Lipa, Lucena, Santa Cruz (La Laguna), and Alabang.

District No. 5.—Ambos Camarines, Albay, Sorsogon, Masbate, and Tayabas (part on east coast); headquarters, Legaspi; substations, Nueva Caceres, Sorsogon, and Masbate.

District No. 6.—Samar and eastern Leyte; headquarters, Tacloban; substation, Catbalogan.

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District No. 7.—Cebu, Negros Oriental, Bohol, Misamis, Surigao, and western Leyte; headquarters, Cebu; substations, Tagbilaran, Dumaguete, Cagayan, and Surigao.

District No. 8.—Iloilo, Capiz, Antique, and Negros Occidental; headquarters, Iloilo; substations, Silay, La Carlota, and Capiz.

District No. 9.—Moro Province; headquarters, Zamboanga; substation, Davao.

SUBSEQUENT OPERATIONS.

The annual report form for the calendar year 1906 was prepared and sent out to all correspondents who, up to January 1, had been engaged to undertake the work. The preparation of reports was not fully understood by the correspondents, and after a wait of 30 days only a few dozen reports had been filled out and returned. On February 1 Mr. Moss was granted leave of absence with permission to visit the United States, and from that date to the close of the fiscal year Mr. H. T. Edwards was in charge of this work. Much of the remainder of the fiscal year was spent in corresponding with provincial and municipal authorities with a view to securing their hearty cooperation in this work, and the agricultural inspectors and other employees of this bureau in the provinces visited many different municipalities for the purpose of arranging personally with correspondents who would furnish us with the desired information.

A number of circular letters were sent out and the correspondence involved has been necessarily very extensive. A system of filing and indexing the reports received was effected and blank forms were prepared for tabulating all of the statistics obtained.

All of this work has taken much time and patience, but the results obtained have been fairly satisfactory.

PROGRESS OF THE WORK.

The establishment of an efficient crop-reporting service in a country like the Philippine Islands, where agriculture is comparatively undeveloped and transportation facilities are limited, is necessarily slow work. In view of the conditions above mentioned, it is considered that the progress made is most encouraging. On January 1 the service was in process of organization. At that time we had no reporters and had received no reports. On June 30 we had a corps of 370 municipal reporters, representing 308 municipalities, or nearly one-half the total number of municipalities in the islands, and had received a total number of 1,628 reports. It is believed that the practicability of establishing a crop-reporting service in this country has been fully demonstrated, and that this service can be extended during the present year so as to include every municipality in the archipelago.

We now send every month to each reporter a printed form for the report, a stamped return envelope, and a circular or circular letter on some agricultural subject of current interest.

QUALITY OF REPORTS.

The primary requisites of an efficient crop reporter are that he shall prepare accurate and complete reports, and shall forward these reports regularly and promptly. The preparation of satisfactory crop reports requires a certain amount of experience and training, and all of our reporters are as yet new to the work. We receive many excellent reports and others that might well be improved. The quality as a whole is very good, and it is only reasonable to suppose that it will improve as our reporters become accustomed to the work and gain more experience. They are not received as promptly as might be desired, but improvement in this direction is noticeable from month to month.

COMPILATION OF REPORTS.

Up to the present time no attempt has been made to compile or tabulate the statistics received. The necessary forms for this tabulation have been prepared and are now in the hands of the printer. As soon as they are received this work can be taken up.

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PUBLICATION OF REPORTS.

An essential part of a crop-reporting service is the prompt publication of the data received. This work can not be satisfactorily done until the service is fairly well established. Up to the present time the only crop-service data published have been a few brief reports on agricultural conditions in the provinces. This service now furnishes sufficient material for a monthly "Crop Reporter," and such a publication would greatly increase the efficiency of the work.

PRACTICAL RESULTS OF THE CROP-REPORTING SERVICE.

The collection of statistics and information regarding agricultural conditions throughout the islands is a most important line of work, but of even greater importance is the fact that the crop-reporting service brings the bureau into direct touch with the farmers of every municipality where we have a reporter, not occasionally and infrequently, but regularly every month. The reporter is, in a certain sense, the representative of the bureau of agriculture in the municipality. He knows what the bureau is in a position to do for the farmers, and the needs of the farmers in his particular municipality. The greatest obstacle in the way of improvement of agricultural conditions in the provinces is to get in touch with the average Filipino farmer. The crop service offers a simple and practicable means of bringing this about.

In connection with the monthly reports we receive many requests for seeds, plants, and publications, and for assistance in the work of stamping out infective animal diseases and destroying pests. As our reporters become better acquainted with the work and when, through the monthly reports, we know more about the actual conditions in each municipality, this work can be largely extended.

PUBLIC SERVICES.

SEED AND PLANT DISTRIBUTION.

EXTENT.

Interest in the seed distribution remains unabated. The number of applicants for seed is increasing, and the amount of seed sent out has exceeded that of any previous year. A gratifying feature of this work has been the largely increased number of applications for farm seeds. During the fiscal year ended June 30, 1907, 42 per cent of all the collections issued were farm seed as compared with 20.5 per cent for the previous year.

The total distributions of farm and garden seeds during the year have been as follows: Farm seeds 2,184 collections, each of which contained one or more kinds of seed; garden seeds 3,763 collections, averaging 8 packets of seed to each collection. These were sent to 3,078 different persons in 519 different municipalities and barrios. This distribution included every province in the archipelago. In addition to seeds sent out, 1,361 packets of garden seeds were given to people who called at the office of the bureau in Manila.

CLASSES OF SEEDS AND PLANTS DISTRIBUTED.

The various seeds and plants distributed during the past year may be classified under the following heads:

1. General farm crop seeds.
2. Maguey plants.
3. Garden vegetable seeds.
4. Flower or ornamental plant seeds.

General farm crop seeds.—Distributions of farm seeds of especial interest were field corn, sesamum, Carolina golden rice, and peanuts. A considerable amount of the corn distributed was produced at the Singalong experiment station where, for the first time, we succeeded in raising seed corn that was, in all respects, fully up to the standard of the type procured from the United States. A part of the sesamum seed distributed was acquired by purchase and a part was donated by M. Edoard Vidal, of Manila, who selected this bureau as the medium for the widest and most effective distribution of this valuable oil seed.

Our experiences and those of others have been generally good with broom corn, field corn, cowpeas, velvet bean, Kafir corn, sorghum, rice, and sugar cane. Of cotton, teosinte, and the new varieties of tobacco and peanuts, we

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have not yet received reports sufficient to justify conclusions. Barley and oats fail to produce grain and indicate usefulness as forage plants only at high altitudes. Alfalfas and clovers in the lowlands have invariably died out, even where the soils were inoculated with the specific bacteria called for by each species. At high elevation sufficient success has been attained to justify further experimental work with these plants. Rape and rye have been tried only at La Trinidad, and data of results obtained have not yet been received.

Maguey plants.—The distribution of Hawaiian sisal plants has had three direct results: It has introduced into the islands an improved variety of maguey, has furnished a supply of plants in localities where Philippine maguey could not be obtained, and has greatly stimulated the planting of our local maguey.

The first lot of 50,000 Hawaiian sisal plants was received in Manila in July, 1906. They were distributed in 8 provinces, largely through the provincial governors.

The second lot of 50,000 plants was received in August, 1906. They were distributed in 18 provinces, both through provincial officials and direct to the farmers.

The third lot of 120,000 plants was received in November, 1906. Of this shipment 15,000 were sold to the Moro Province at cost price, 10,000 were furnished the bureau of lands for distribution on the friar estates, 5,000 were planted at the Lamao Experiment Station, and the remaining 90,000 were distributed in 33 different provinces. The total number of Hawaiian plants received and distributed during the year was 220,000. In a majority of cases these plants have been distributed through provincial governors, teachers, and other responsible persons. Our records show that 37 provinces and districts, 196 municipalities, and 502 individual farmers have received Hawaiian sisal plants. It has been impossible, however, to obtain complete data on this subject, and the ultimate distribution of these plants has been much more widespread than is indicated by these figures.

During the past six months we have received many reports stating that the Hawaiian plants have given entire satisfaction and numerous requests for more have been received.

On June 30, 1907, the total number of requests that had been received for maguey plants was 1,342. These requests were received from 43 provinces and districts and from 381 municipalities. In order to supply this demand for maguey plants an order was placed in February, 1907, with the Hawaii agricultural experiment station for 500,000 sisal pole plants, to be delivered in Manila during July and August of the present year.

Garden vegetable seeds.—Unqualified success has been reported from every province, excepting Samar, with beans, beets, cabbages, carrots, eggplant, mustard, okra, peppers, radishes, parsley, New Zealand spinach, tomatoes, and turnips. Sweet corn, American cucumbers, melons, watermelons, and squashes have been the subject of many conflicting reports, ranging all the way from "very good" to "complete failure." All persons who have had failures, except in growing corn, concur in attributing their losses chiefly to insect enemies, which through ignorance, apathy, or neglect to procure the proper remedies, have remained unchecked. Brussels sprouts, rhubarb, and French artichokes, so far as tried, have proved most unsatisfactory. Asparagus has made a very strong growth wherever planted, but since it has no winter resting period here it tends to produce small tips and a heavy growth of plume. Kohlrabi of excellent quality and size was grown by the bureau experimentally and is deemed worthy of considerable distribution. Celery has made good growth, but has so far resisted all attempts to blanch it without its rusting badly. American peas, if planted so as to mature in our coolest season, invariably fruit, but are not as prolific at low altitudes as could be desired. A few of the edible podded Japanese varieties gave heavy yields, and a large distribution of these varieties is contemplated.

Flower and ornamental plant seeds.—Heretofore the bureau has not distributed flower seeds, but as there has been a constantly increasing demand for this class of seeds a small supply was purchased during the past year. These flower seeds have been distributed to 173 persons. The following varieties of flower seeds have been sent out: Amaranthus, balsam, calendula, caliopsis, cockscomb, marigold, portulacca, zinnia, nasturtium, and ageratum. Excellent flowers of all of these, except the last two, have been secured. The failure of the last is remarkable for the reason that a closely allied species occurs as a noxious weed throughout the archipelago.

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NATURE OF REQUESTS.

Two very gratifying features in connection with the seed and plant distribution during the past year are worthy of mention. One is the greatly increasing number of small farmers who apply at the office in person for seeds, and the other is the very marked increase in the number of applications which have been received from the provinces of Samar and Leyte. During the last few weeks of the year there were received a large number of requests from these two provinces for both field and garden seeds. This seems to have resulted directly from the restoration of peace in these two provinces, and shows that the people there are now resuming their normal occupations on the farms.

PROPOSED CHANGES.

During the past two years only one distribution of seeds has been made each year, this distribution beginning the latter part of September and lasting through December. At this period of the year conditions prevailing on the west coasts of most of the islands are best suited to gardening and farming operations. There is a small demand throughout the year, especially from Americans and school children, but on account of the difficulty of keeping seeds in satisfactory condition many of these requests have been held over for the dry-season distribution. Now that there is a growing demand on the east coast of those islands, where the seasons are the reverse of those on the west coast, it is thought that a return to the custom of making two seed distributions per annum will be demanded. Two distributions each year will necessitate two importations, for the reason that seeds deteriorate rapidly in this country. The difficulties of keeping seeds in perfect condition in these islands are sufficiently great at best, and it would be inviting certain failure to attempt the distribution of seeds which had been kept on hand a number of months.

STEAM PLOWING.

LANDS PLOWED.

In November, 1906, the large steam plow formerly used at the Murcia rice farm was shipped to the Santa Rosa friar estate, with a view to its use in plowing the lands formerly cultivated in sugar on that estate. These lands have been abandoned for about ten years, have become overgrown with a dense growth of the native grasses, talahib and cogon, as well as occasional spots of timber, so that it is almost impossible to break them again with farm animals. There are two classes of land on this estate. The lowlands along the lake shore are of a sandy nature, intermixed with silt brought down by the small streams originating in the near-by mountains. These are generally cultivated in rice, and are so covered with dikes for retaining the irrigation water that it is impracticable to plow them with a steam plow. The foothills lying between the lowlands and the mountains are of a gentle, rolling nature, and of black volcanic formation. There is occasionally a sandy spot or a hill, on top of which there is a heavy layer of reddish iron-ore gravel, but in general the soils are black in color, of fine texture, and quite pasty when wet.

OBSTACLES.

An effort was made to use a steam gang consisting of six 14-inch share plows of the sandy land type, the only plow of this kind owned by this bureau. As was predicted, it would not turn the soil and was soon pronounced a complete failure. An effort was then made to use an 8-disk steam gang. This worked fairly well where the land was sandy, free from grass and trash, and especially where it had been broken once. However, land once gotten into this condition is easily plowed by the use of farm animals, thus obviating the necessity for a steam plow. As this gang was to all intents and purposes a failure, a series of investigations followed in an effort to find a plow which would do this work properly. The result was the building of two gangs carrying 8 and 12 disks, respectively, and a middle breaker each. These gangs have extra heavy frames, triangular in shape, and the drawbars are attached to the base of the triangle. The middle breaker, with a heavy wheel in the rear, is at the apex of the frame. An equal number of disks are set on each side, one half of them turning the dirt in one direction and the other half in the opposite direction. Each gang has 3 wheels, all of which are adjustable by levers, and are used for regulating the

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depth of the cut. The large gang cuts a swath 12 feet wide, or 4½ feet more than the gang of 6-share plows, and is apparently drawn by the 35-horsepower engine as easily as the latter. The small gang cuts about 8 feet and was made for the 18-horsepower thrashing engine, which has been sent to Santa Rosa from Cavite Province. It has, however, proved too heavy, and two of the disks have been removed, thus decreasing the cut to about 6½ feet. Both gangs have been pronounced, by the farm machinery expert of this bureau, a decided success, and while the most valuable part of the dry season for steam plowing was consumed in making the experiments, it seems probable that we are now prepared for such plowing as may be demanded in the future. Many difficulties have had to be met and overcome in connection with steam plowing, among which is the inability of the landowners to do a reasonable part in connection with the work and the necessity for accomplishing practically everything at government expense. It was originally intended that the landowners should furnish the labor, haul the water, and furnish the fuel, which latter was to consist of dry wood cut in the vicinity. The labor they have furnished has been quite unsatisfactory, because most of the plowing is being done quite a distance from where any people live. The laborers have not as a general rule camped with the plowing outfit, but have returned to their residences in the barrios at night, and have been correspondingly late reporting for duty the following morning. Animals for hauling wood and water have been quite scarce, and the available supply of dry wood was soon exhausted. It is not practicable to cut and cure wood except in the dry season, and as this work has been neglected, the continuation of plowing operations with only wood as a fuel seems impracticable. Realizing these difficulties, the landowners sent a delegation to Manila with a request that the government supply the necessary fuel and charge it as a part of the expense of plowing the land. The price at which this bureau agreed to plow the land with labor, fuel, and water furnished by the landowners was ₱5 per hectare. To furnish coal as a fuel for this plowing will practically double the expense, and as it will also be necessary to put a trained force of hands paid and subsisted by the government on each of the plows, it is feared that steam plowing will cost more than the landowners will feel justified in paying.

PROSPECTS.

There has been a constant demand for steam plowing on other friar estates and private lands in the provinces lying near Manila. It is not thought wise to encourage the people to believe that this work is an entire success, in view of the difficulties which this bureau has had to contend with during the past year. If the infective animal diseases constantly destroying the domestic animals used for draft purposes on the farms could be placed under control, even to the extent of making it reasonably safe to import cattle, it is probable that plowing with animals would be a better method of reclaiming the uncultivated lands than to freely advocate steam plowing.

ADVICE.

A number of trips of investigation have been made by the assistant director to the different friar estates and several private haciendas for the purpose of advising the landowners relative to improvements on the same. One trip made to the Imus estate, where there was considerable demand for steam plowing, developed the fact that there was no road over which a steam plow could be taken before reaching the lands where the plowing was desired, and that possibly three-fourths of these lands were overgrown with timber and brush to such an extent that the operation of a traction engine was practically out of the question. The owners were furnished with stump pullers, advised to clear the land from timber, and make an effort gradually to bring it into cultivation by means of domestic animals.

A trip was also made to the friar estates lying immediately northeast of Manila, with a view to investigating the character of the land, that recommendations might be made regarding the most desirable crops to be planted there. These estates are not, as a general rule, adapted to the growing of rice and sugar cane on account of the extremely shallow soil and scarcity of irrigation water. They are, however, admirably adapted to the growing of maguey, kapok, ilang-ilang, and such other crops as are not exacting in the matter of soil and water.

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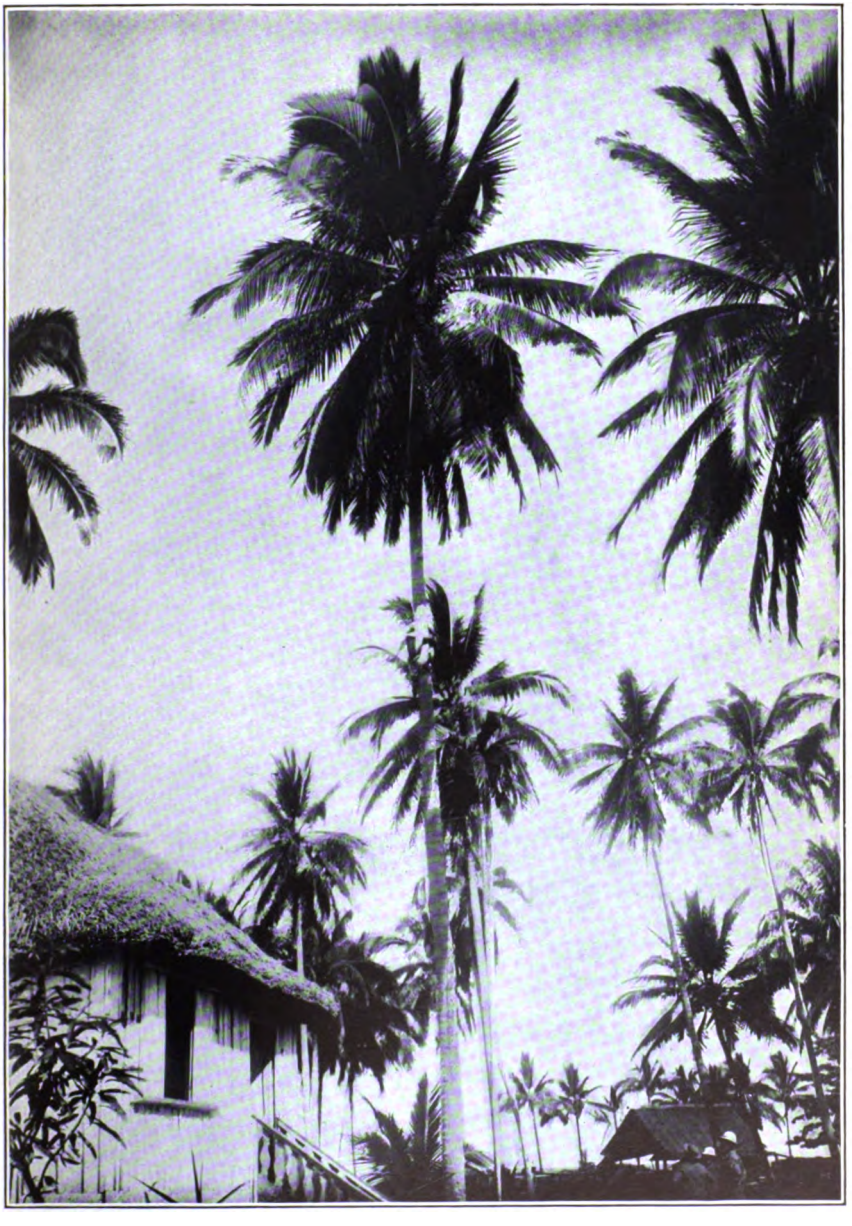

PLATE 1. THE COCOANUT (COCOS NUCIFERA LINN.).

(A staple crop in the Philippines.)

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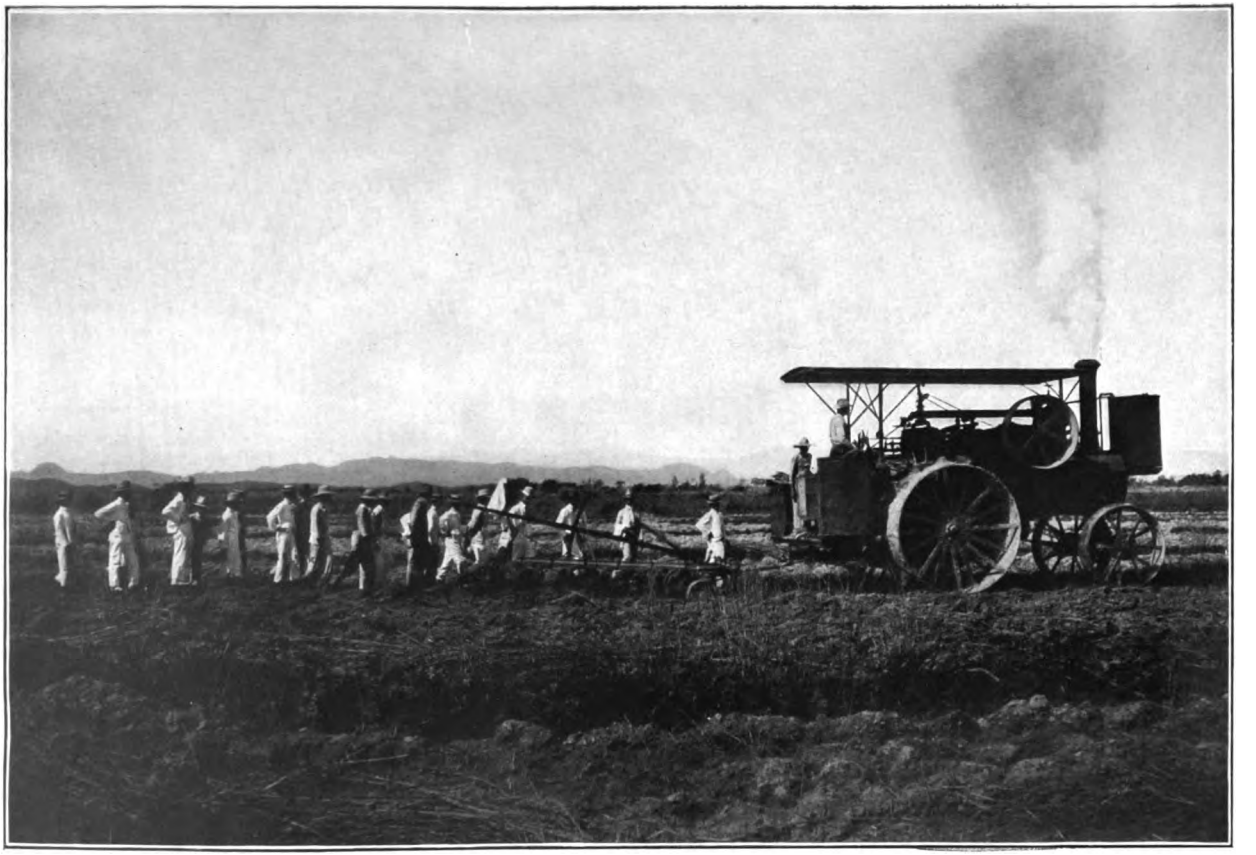

PLATE 2. BREAKING COGON SOD WITH STEAM PLOW.

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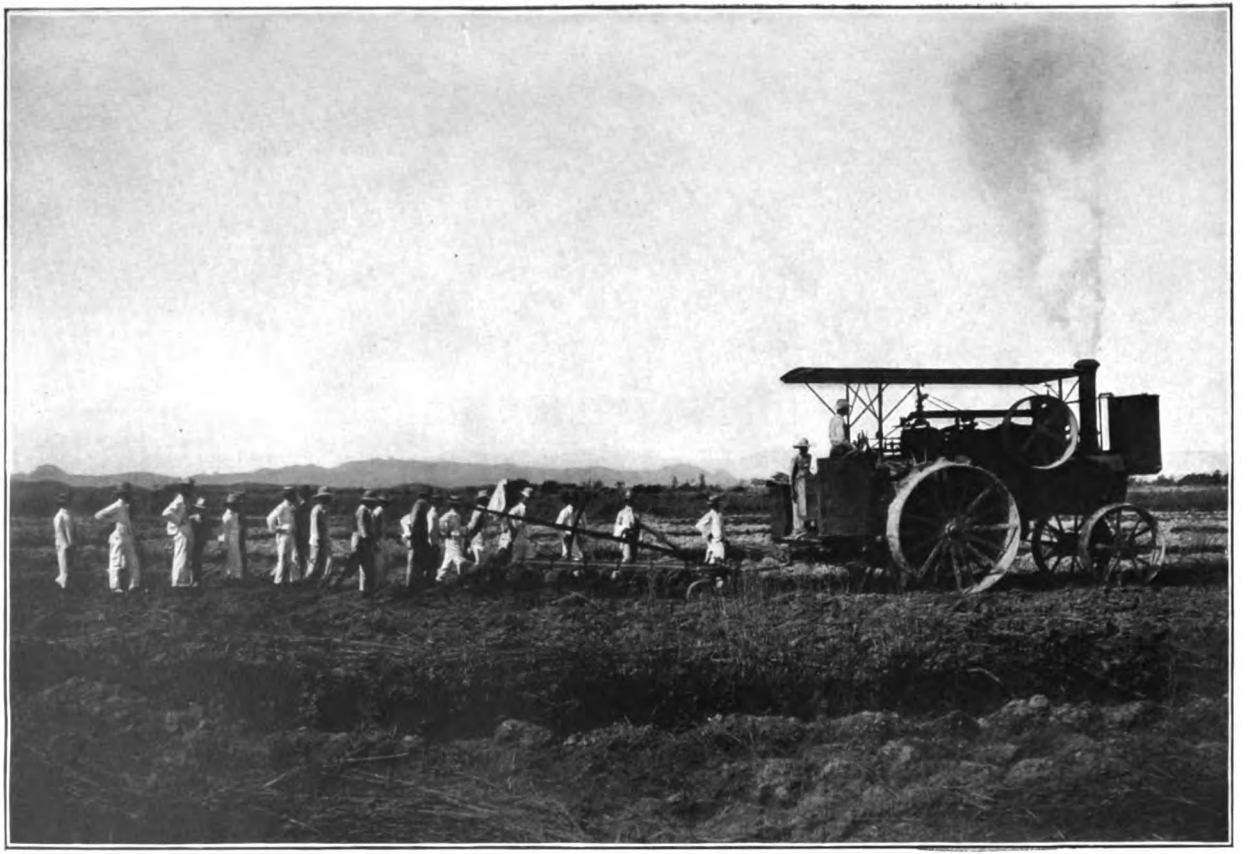

PLATE 2. BREAKING COGON SOD WITH STEAM PLOW.

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PLATE 3. PLOWING RICE LANDS WITH NATIVE BULLOCKS AND AMERICAN GANG PLOW.

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PLATE 4. FIELD OF ABACÁ.

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PLATE 5. ABACÁ FRUIT AND SEED.

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PLATE 6. GUINEA GRASS, SHOWING NEW GROWTH TWO WEEKS AFTER CUTTING FOR GREEN FORAGE.

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PLATE 6. GUINEA GRASS, SHOWING NEW GROWTH TWO WEEKS AFTER CUTTING FOR GREEN FORAGE.

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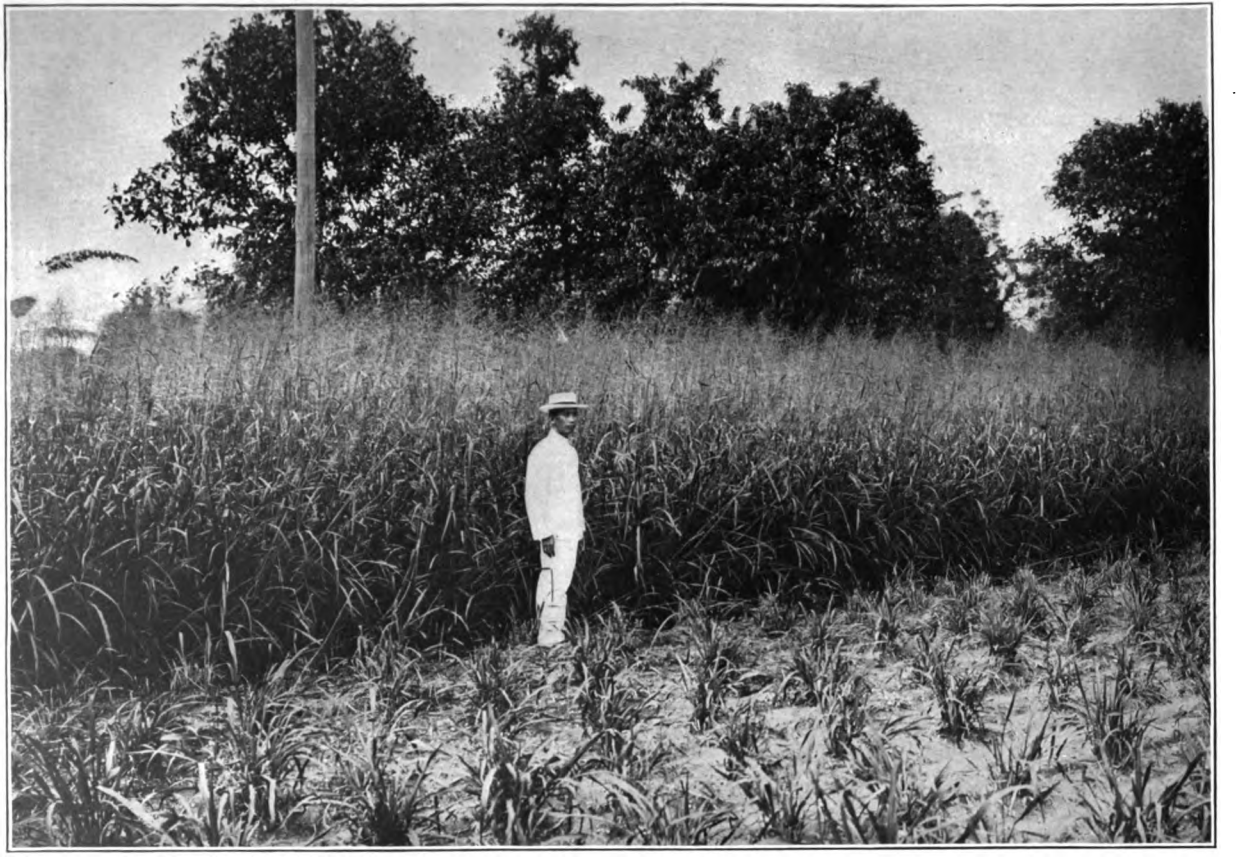

PLATE 7. GUINEA GRASS IN FLOWER AND SEED.

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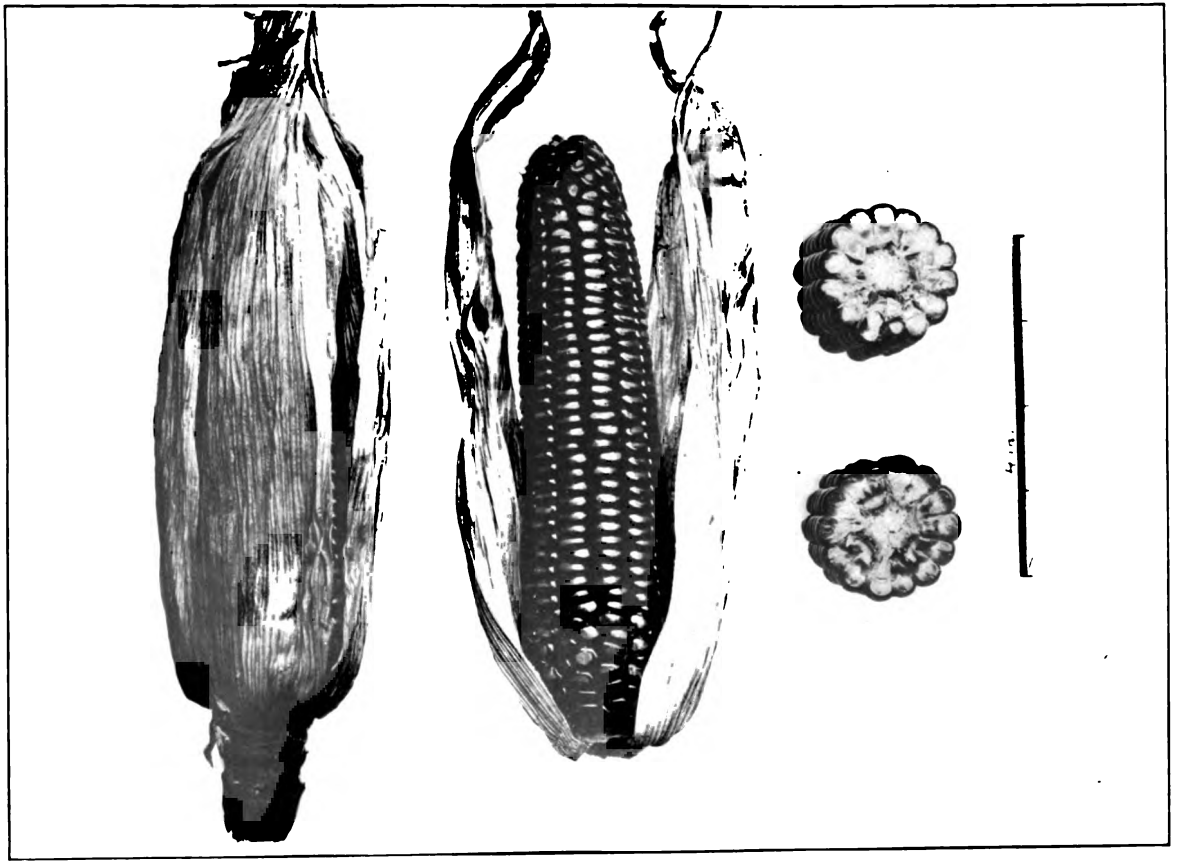

PLATE 8. NATIVE FLINT CORN.

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PLATE 9. SWEET SORGHUM AT THE SINGALONG EXPERIMENT STATION.

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PLATE 10. YOUNG FLORIDA VELVET BEANS. GROWN IN VEGETABLE GARDEN TO ENRICH SOIL AND KILL NUT GRASS.

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PLATE 11. NATIVE WHITE CASSAVA (MANAHOT UTILLISSIMA). TREES IN BACKGROUND ARE CEARA RUBBER (MANAHOT GLAZOVII).

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PLATE 12. NURSERY OF HAWAIIAN SISAL AT SINGALONG EXPERIMENT STATION. TWO TREES IN FOREGROUND ARE AVOCADO PEARS.

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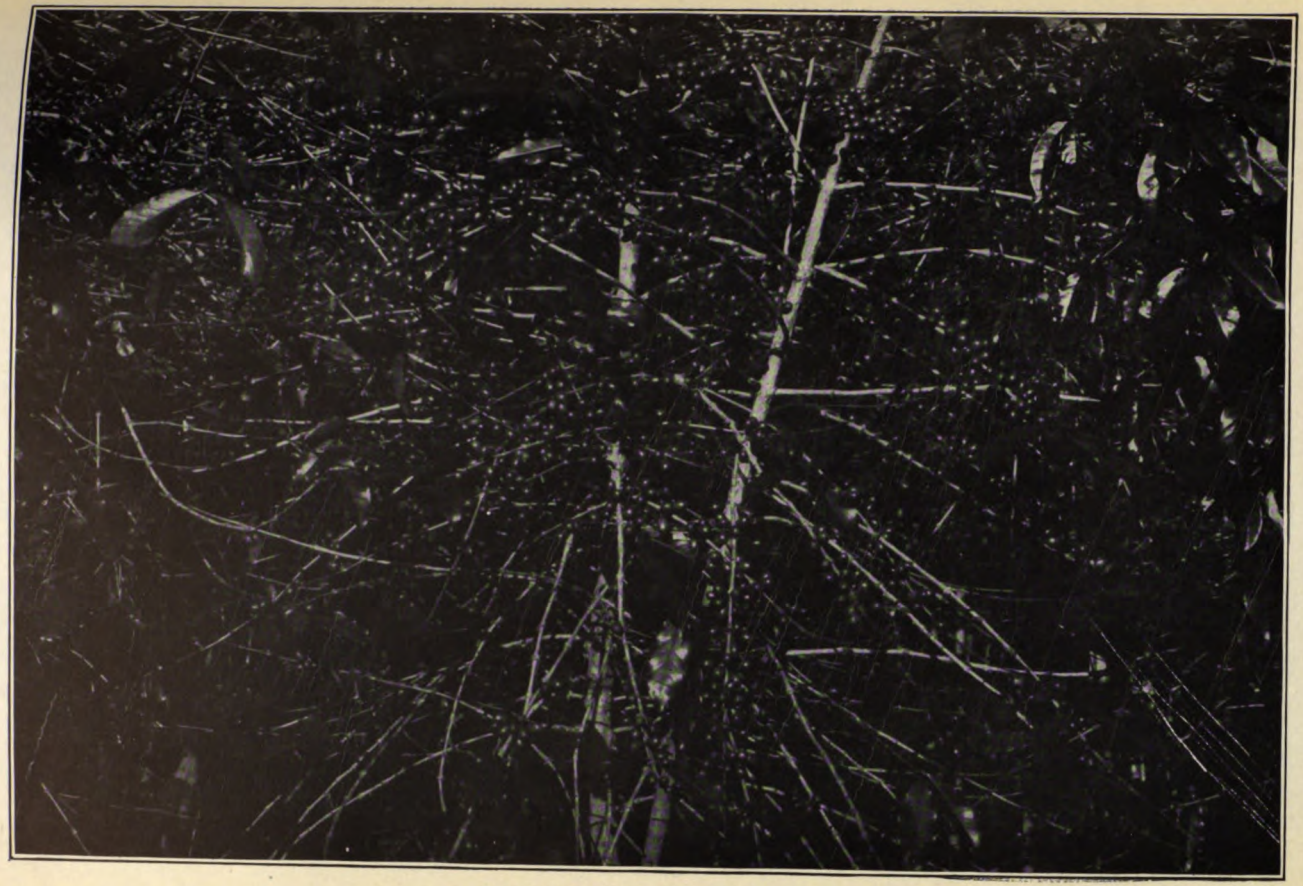

PLATE 13. COFFEE TREE IN FRUIT.

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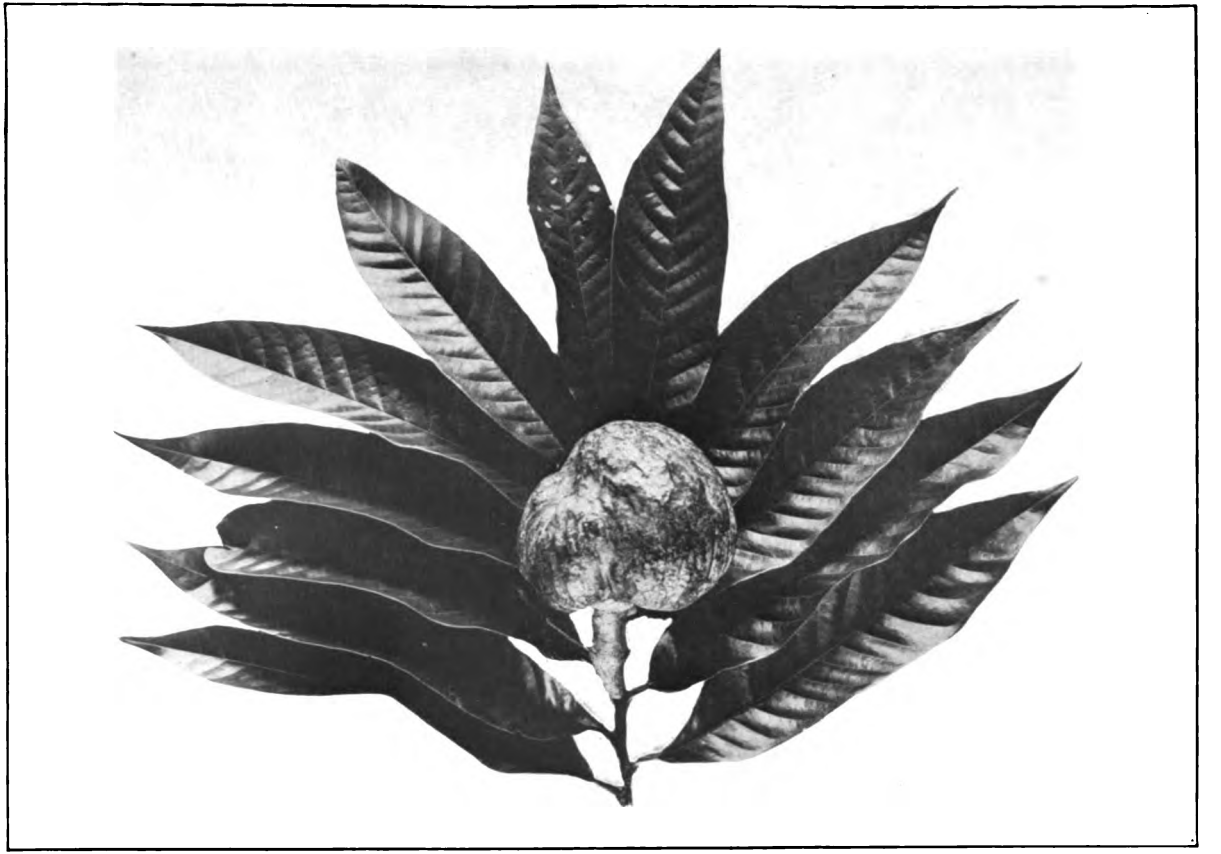

PLATE 14. THE ANONA (ANONA RETICULATA), SHOWING LEAVES AND FRUIT.

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The Muntinlupa estate was visited in the month of October, 1906, and after a careful investigation recommendation was made that all of the unleased portion of this estate be surveyed into large blocks and offered for lease and sale for the purpose of planting maguey. This suggestion was adopted by the bureau of lands, and practically all of the land was leased by the end of the fiscal year.

LOANS OF ANIMALS FOR BREEDING PURPOSES.

The bureau of agriculture has continued to furnish American stallions, jacks, bulls, and boars for breeding purposes in the provinces. In many cases the number of services rendered by these animals has not been as large as could reasonably be expected. This fact has been due to several different causes, among which are the following: There is a notable lack of appreciation of the value of better blood. In some cases horses stationed in the best horse-breeding districts have had practically no service, while hundreds of mares in easy reach were running at large with a herd of horses containing numerous native stallions of all ages and qualities. In many cases the native owner of mares does not even take the pains to breed them to the best native ponies. During the year 11 stallions and 2 jacks have rendered 228 services. Of these, 1 Arabian stallion in a remote mountain district has served 62 mares, 2 in charge of the bureau have served 75, and the remaining 10 have served only 91, or an average of only a little over 9 each.

The groundless fear that native mares would not foal colts sired by larger horses has also continued to exert a bad influence. In other cases horses have been loaned to private parties, whose interest in their use did not extend beyond the breeding of their own animals, and under such circumstances no effort has been made to secure outside mares to be bred. There have also been circulated various rumors, such as the charging of extortionate stud fees, or the taking of part of the colts by the man having the horse in charge, all of which no doubt have had their influence in deterring those who might otherwise have patronized the horses.

A number of excellent colts have been reported during the past few months. No systematic inspection of the foals has yet been made, but this work will be undertaken during the coming dry season.

Three of the stallions have been taken out of private hands and placed in charge of employees of the bureau of agriculture. The persons having charge of these horses have been instructed to campaign them and to obtain, if practicable, full service lists for each one. It is believed that this method will give better results than any other, and that it should be adopted in the future, as the horses are liable to die at any time without having rendered a satisfactory amount of service. It will be somewhat expensive to handle the stallions in this way, but the good work they are capable of doing and the amount of money already invested in them are sufficient reasons to justify such expense.

There has been a constantly increasing demand for American and Australian bulls, and while but few have been furnished the past year, this is one line of public service which will be pushed in the future. A number of excellent young bulls are now being raised. All of these bulls have been or will be immunized to rinderpest and sent to provinces where their services are likely to be of the most value.

During the first five months of the year the prospects for a further distribution of Berkshire pigs seemed very bright, but on account of the advent of cholera among them the latter part of November the entire lot except 6 sows died. About four months' time was lost in obtaining another good boar from Australia, and it will be well into the next fiscal year before we shall have another lot of pigs ready for sale or distribution. There is a constantly growing demand for pigs, and while the people generally have no disposition to pay fancy prices for them there is a reasonable appreciation of the fact that well-bred pigs are superior to those of the native type.

We have also had a number of requests for the loan of Angora and Maltese milk goats, but up to the present time have been able to furnish only one Angora and two Maltese billies for public service.

There has been a small demand for poultry, which has generally been met by directing the inquirer to local dealers who have poultry for sale. As the few chickens still owned by the bureau of agriculture have been loaned to another bureau we have not been able to supply this line of live stock.

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FARMS ABANDONED.

Two farms have been abandoned during the year. One of these was the dairy farm operated at San Juan del Monte, near Manila, where the dairy herd had been kept for a little more than two years. The area of land available at San Juan del Monte was small, very stony, rendered dangerous for cattle by the large number of stone quarries scattered over it; furthermore, the land was in litigation, and the courts have since decided that it is not the property of the government. The dairy herd was moved from there on December 29 to a place selected for a new dairy farm on the Muntinlupa friar estate, in the southern portion of Rizal Province.

The other farm that was abandoned was a tract of about 25 hectares of land on the Santa Cruz friar estate, in Cavite Province, which was under cultivation in rice. A part of this piece of land was plowed by means of a petroleum traction engine, which this bureau was testing, and the remainder was broken with the 18-horsepower threshing engine, which had been sent to San Francisco de Malabon in connection with the rice-threshing outfit belonging to this bureau. A strong prejudice had grown up there against the work of the threshing machine, which made it impracticable to operate it during the last harvest season. The exact cause of this prejudice is not known, but is reputed to be a superstition or belief that rice threshed on the machine is in some way injured, so that it produces a low-grade product in milling. It was not the intention of this bureau to plant the land plowed, but to lease it to small planters residing on the friar estate. As no applicant appeared to take it and as we had just imported a large supply of Carolina golden rice, it was decided to plant the same at Santa Cruz and to produce seed for distribution. It was not known at the time that the Carolina golden rice was a short-season variety and would not stand transplanting. The result was that, although the plants grew very rapidly in the seed beds, when transplanted they failed to recover from the dwarfing effect. The harvest was less than the seed sown and was pronounced a decided failure. At the same time a considerable quantity of this rice was sown in drill at the Singalong experiment station in thin, sandy soil and produced at the rate of 52 cavans per hectare without artificial irrigation. At the time the threshing engine was removed from Santa Cruz all of the machinery and implements used in the cultivation of the rice were shipped back to Manila.

NEW FARM ESTABLISHED.

One farm has been opened during the year. It is known as the Alabang stock farm, and when thoroughly equipped all of the live stock belonging to the bureau of agriculture, which has been kept in a number of places in and around Manila, will be taken to this farm.

MACHINERY INVESTIGATIONS.

The absence of the machinery expert of this bureau, who was in the United States from the beginning of the fiscal year until December, has seriously handicapped our machinery investigations. Some progress has been made, however, in this work.

ABACA MACHINES.

There has been more definite progress made during the past year in the work of perfecting and introducing abaca-cleaning machines than in any previous year in the history of the islands.

The development of the "Welborn-Bracy" abaca-cleaning machine, of which mention was made in the last annual report of the bureau of agriculture, has been continued by the company which controls it. The essential principle is that it cleans the fiber by means of knives on revolving wheels. A machine considerably larger than the original model has been designed, and the first of these larger machines was completed during the month of April. The weight is about 2 tons, its operation requires from 12 to 15 horsepower, and it can not be considered as belonging to the class of so-called "portable" machines. A contract has been let for the construction of 10 more, which are to be built in Manila, and the owners of this patent seem absolutely confident that they have a thoroughly reliable machine.

In October, 1906, a prospectus was issued by the proposed Manila Hemp Machine Company in which it was stated that the original Welborn-Bracy machine would clean 1,000 pounds of dry abaca fiber in ten hours. This clean-

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ing capacity has not been fully realized, however, since the machine has been placed in the field. The engineer who has operated both the original and the improved machine states that the latter has been given a test run of eight hours, during which time 625 abaca stalks yielding 432 pounds of dry fiber were cleaned. This gives an average of 54 pounds per hour, or 540 pounds per day of ten hours. It should also be said to the credit of this machine that its capacity depends largely on the skill of the operators and that these results were obtained in a locality where labor is very scarce and inefficient and where many of the laborers had never before seen a machine of any kind in operation. The engineer claims that after this labor has been trained for three or four months he will be able to clean from 60 to 80 pounds of fiber per hour, or from 5 to 6 piculs per day of ten hours.

There has also been considerable development in the construction of abaca-cleaning machines which use the old principle of cleaning the fiber by means of a fixed knife. One company now has several such machines in operation in the Province of Albay. Another company, capitalized at ₱150,000, has been organized for the purpose of manufacturing and placing on the market a machine of this type. Several other different abaca-cleaning machines are either in course of construction or are ready for trial tests.

The bureau of agriculture has continued to furnish such assistance to the inventors and owners of abaca-cleaning machines as has been practicable. Raw material has been supplied for making trial tests, and these tests have been made, when so requested, under the supervision of the fiber expert. Samples of machine-cleaned fiber have been sent to many of the leading cordage manufacturers in the United States and reports and opinions regarding the fiber have been obtained. These reports indicate that there is no ground whatever for the belief that the fiber is injured by the machine during the process of cleaning.

KAPOK MACHINES.

A machine for cleaning kapok, designed by the assistant director, was partially constructed early in the year. This machine was a combination of the cotton gin and threshing machine. The work was discontinued to take up a method of cleaning kapok suggested by the director, in which a small portable threshing machine was used. This machine was modified by placing on it a suction feed which carried the kapok directly into the cylinder. The lint, seed, and burrs were, however, discharged together and much of the work of separation had to be done by hand.

MAGUEY MACHINES.

The large amount of maguey planted during the past year and the prospective development of this industry in the Philippine Islands indicate that there will be a considerable demand for maguey-cleaning machines in this country within the next two or three years. The greatest obstacle to the introduction of maguey-cleaning machines in the Philippines at the present time is the fact that our maguey industry is not sufficiently developed to use advantageously the large machines which are in general use on the plantations of Yucatan.

The bureau has furnished information in regard to the development of our maguey industry to the leading manufacturers of fiber-extracting machines in the United States, and advices have been received from one of these companies that a trial machine would be shipped to the islands. One of the small "Pioneer" sisal-cleaning machines was received by the bureau just at the close of the fiscal year, but it has not yet been placed in operation.

RICE MACHINES.

Three different kinds of cylinder rice hullers and polishers have been tried and the results have been quite unsatisfactory. It is probably not entirely fair to charge this failure to the machines, as they have been successfully operated in the United States and in a few cases in the Philippine Islands. The proper cleaning and polishing of the Philippine rice crop is quite a problem on account of the large number of varieties grown, the difference in size and texture of the grain, and the various methods of harvesting and handling. Enough information has been gained, however, to warrant the conclusion that burr hullers are better adapted to present conditions in the Philippine Islands than the more modern cylinder hullers.

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BROOM-MAKING MACHINES.

The farm machinery expert of this bureau was instructed to investigate the broom-making industry during his vacation in the United States. The success already obtained in the growing of broom corn and the production of high-grade brush seemed to indicate that the manufacture of brooms could be made a profitable small industry here. During the time that our representative was studying the industry in the United States this subject was brought to the attention of persons here who were thoroughly conversant with broom manufacture. They at once took the matter up and began operations in a small way. Sample brooms of three grades have been received at this office and are unquestionably equal to any produced in the United States. There is not a very extensive market in the Philippine Islands at the present time for this kind of brooms, but the industry is one which can be enlarged by developing an increased demand for the product.

DIVISION OF PLANT INDUSTRY.

This division includes all general plant investigations, laboratory and field tests of seeds and the work done at the Singalong experiment station, Manila; the Lamao experiment station, Bataan; the Baguio experiment station, Benguet; the La Carlota sugar farm, Occidental Negros; and the coffee experiments at Lipa, Batangas.

FIBER INVESTIGATIONS.

MAGUEY.

OUTLINE OF WORK.

The extension and development of the maguey industry has been an important line of work of this bureau during the past year. An attempt has been made to do four things: First, to show the farmers throughout the islands the value of maguey as a Philippine crop; second, to supply plants wherever they could be used to good advantage; third, to establish a nursery which should furnish a future supply of plants for distribution; fourth, to introduce into the islands a maguey cleaning machine suited to the conditions which exist here.

EDUCATIONAL.

Maguey is widely distributed throughout the islands, but a year ago the value of this plant was not generally understood, and, excepting in two or three provinces, but little of it was being planted. To-day there is not a municipality in the islands where maguey is unknown, and this crop has been, and is being, planted in every province where conditions are suitable for its cultivation.

Early in the year the bureau published, in English and Spanish, a bulletin on the cultivation of maguey in the Philippine Islands. Five thousand copies of this bulletin have been distributed. During the year we have published circulars on maguey in English, Spanish, Tagalog, Ilocano, Cebuano, Boholano, and Masbate dialects, 27,000 copies of which have been distributed. It is believed that this circular, which is a simple catechism on the elementary facts relating to maguey cultivation, has been most effective in producing results. In addition to general distribution, these bulletins and circulars have been furnished the bureau of education for use in the schools. This distribution of printed matter has been supplemented by a large amount of correspondence on the same subject, and many planters from the provinces have come to Manila and visited this bureau for the purpose of obtaining information regarding maguey. This educational work has prepared the way for the systematic extension of maguey planting in every municipality in the islands where this crop can be profitably grown.

ABACA.

ABACA WASTE.

During the year ending August 31, 1904, this bureau took up the question of the utilization of abaca waste for the manufacture of paper. Samples of this waste were collected and analyzed, and other samples were sent to a large number of paper manufacturers throughout the United States, France, and Great Britain. This waste was tested and reported upon by a number of

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manufacturers, and considerable interest in the subject was aroused. This work has been continued up to the present time, and has also been the subject of extensive investigations by the bureau of science. As a result of these efforts a company has been formed for collecting and shipping this material, and abaca waste is now one of our export products.

FOREIGN MARKETS

The great bulk of the abaca produced in this country is shipped to foreign markets, and practically none of the producers of this fiber are in any way in touch with the manufacturers and consumers in the United States and Great Britain. As questions frequently arise relating to the quality of fiber received, the relative use of abaca and other fibers, and other allied subjects, it is desirable that such information be obtained from the manufacturers and brokers as may be of value to the Philippine farmers, and that we furnish the former with such information regarding the industry here as may be called for. This work has been carried on as in previous years by means of correspondence, reports, and samples sent to and received from the leading manufacturers and fiber brokers in the United States and Great Britain.

PROVINCIAL INVESTIGATIONS.

In October, 1906, the fiber expert made a trip through Albay, Ambos Camarines, and Sorsogon principally, for the purpose of making stripping experiments with different varieties of abaca. Several of the largest plantations in these provinces were visited, and 11 stripping tests were made. The time allotted for this trip was insufficient to allow of thorough work being done in any one province, and the almost continuous rains greatly interfered with the drying of the fiber that was cleaned. Considerable information was obtained, however, and this work is to be continued during the coming year.

A thorough investigation of the leading varieties of abaca in all of the more important abaca-producing provinces should be a work of great value. At the present time we know that the fiber of one province sells for ₱16, and that of another for ₱26, but to what extent the quality of fiber produced is affected by the variety of plant grown is not fully known. If we have certain varieties greatly superior to others which are in general cultivation the fact should be known and these superior varieties given wide distribution. Such an investigation will require considerable time, as we have dozens of different varieties of abaca, scores of local names, and practically no reliable botanical data regarding abaca on which to base these investigations.

GROWING ABACA FROM SEED.

The growing of abaca in commercial quantities from seed has an important bearing on the industry, on account of the limited supply of abaca suckers in certain provinces. In Mindanao some planters report the demand so great that they are finding it more profitable to sell abaca suckers at prevailing prices than to grow the plants for fiber. Of three lots of seed obtained the past year, two large lots proved defective—less than 1 per cent germinating. From a small (150 grams) sample the very good germination of 60 per cent was obtained. The high winds of the dry season scorched and killed off many of the young plants, but 700 survived, were twice transplanted, and then sent to the Lamao station in Bataan for permanent planting. At the time of removal the stems of these seedlings averaged 3 feet 6 inches in height, and were correspondingly stocky and vigorous. The seeds were planted October 14, 1906, and the plants set out permanently June 1 of the present year, thus demonstrating that abaca plants may be obtained from seed in seven and one-half months. Some plants that were slightly protected were of suitable size for permanent planting inside of six months from time of seed sowing. The soil and climatic conditions in Manila where these experiments were conducted were exceptionally bad, and there is no doubt that under favorable conditions the results, including germination, would be much more satisfactory. The procuring of seed is sometimes a matter of much difficulty, as abaca plants are usually cut before the seed matures. Planters who desire to follow this method of propagation can do so by reserving a few fully mature stools of the plant which will produce all the seed required.

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KAPOK.

ESTABLISHMENT OF EXPORT TRADE.

We have found in the case of abaca waste that when a demand for this material was created the establishment of an export trade soon followed. It is believed that the same will be true of kapok, and with this end in view we have been in correspondence during the past year with a number of the leading buyers of kapok in the United States.

Samples of Philippine kapok have been sent to these parties and the reports on these samples have in general been very favorable. The latest report received states that well-cleaned Philippine kapok would be marketable in New York City at 14½ cents United States currency per pound. The firm making this report states that it would be prepared to make a contract for all the kapok that the Philippine Islands could produce. Another firm in the United States, with which we have been in correspondence, has recently placed a preliminary order for a ton of Philippine kapok. The export trade in kapok is now handled by two reliable business firms in Manila, to whom are referred such inquiries as we receive on this subject.

LOCAL DEVELOPMENT.

The development of the kapok industry in these islands calls for two things—the saving of the large quantities of kapok now allowed to go to waste and the increased planting of trees. The value of this fiber is not generally understood throughout the provinces, and there is great need for educational work. Arrangements have been made for carrying on such work along the same lines that have given satisfactory results with maguey. A circular, giving concise and elementary information in the form of a catechism, has been prepared. This circular will be published in English, Spanish, and the more important Philippine dialects, and will be widely distributed throughout the islands. In connection with this work, kapok seeds and plants will be distributed to all persons requesting the same.

MISCELLANEOUS FIBER PLANTS.

There are a great many different plants in the Philippine Islands which yield fibers that would be of value if produced in large quantities and their use once established. The fact remains, however, that any attempt to introduce a fiber that is not already well known in the commercial world is a slow, costly, and, ordinarily, an unprofitable task. We receive many samples of such fibers with inquiries as to their value and possible utilization. Where these samples are of such quality as to justify such action, they are forwarded to fiber brokers in the United States and Great Britain and reports obtained.

Very excellent specimens of "Anabo" (*Abroma augusta*) have recently been received from the province of Iloilo, and have been forwarded to the United States for examination. This is one of our promising local fiber plants, as it is widely distributed in the islands, requires little cultivation, and produces a fiber of fairly good quality.

Specimens of "Sunn hemp," grown at the Singalong experiment station, were forwarded to American manufacturers earlier in the year, but the reports received were not of such a nature as to encourage the further cultivation of this plant.

With conditions favorable for the production of abaca, maguey, and kapok, for which there is practically an assured demand at good prices, it is believed that the cultivation in more than an experimental way of other fiber-producing plants that are not so well known should not be encouraged.

FIBER EXHIBITS.

On February 13, 1907, we forwarded to the Pacific Commercial Museum, in connection with a general exhibit of agricultural products, an exhibit of Philippine fibers and fiber products. This exhibit included 10 sample bales of abaca, showing the fiber of different provinces; 22 specimens of abaca from the Moro Province; selected samples of machine and hand cleaned abaca and maguey; kapok, cotton and cocoanut fiber, and a very fine collection of textile fabrics.

We have received during the year a collection of abaca samples from the district of Davao, and other samples of minor importance.

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SEED AND PLANT INVESTIGATIONS.

SEED PRESERVATION EXPERIMENTS.

Some original laboratory work has been carried on during the year in the preservation of seeds. The results already achieved promise to solve a problem which for many years has been vexing importers and handlers of seed in all hot countries where the minimum atmospheric humidity never falls below 55° and the mean normal for one-half the year approximates 85°. Hermetical sealing, while a protection to the seeds in transit, is of no assistance after arrival unless the seeds can be disposed of as soon as opened, which is of course impracticable for merchants and others handling seeds in large lots. The difficulty of preserving the vitality of seeds in this country is indicated by the fact that peas, which on arrival from the United States gave us an 84 per cent germination test, failed entirely thirty days later. Corn, cotton, and other oily seeds have deteriorated within three weeks.

The experiments described below were conducted with a lot of very fine American corn seed received here early last December, and which showed the remarkably good germination average of 95 per cent. The object of these experiments was to determine the value of the method of keeping seed in hermetically sealed jars, as compared with the method used in this bureau. Three 2½-pound lots of the corn were taken at random from the shipment. One lot was placed in an ordinary metal seed cannister with a reasonably close-fitting cover. A second lot was placed in a glass jar provided with a close-fitting ground-glass stopper and at once hermetically sealed with melted paraffin. The third sample was put in a similar jar, in which had been placed an inch of coarsely broken charcoal that had just been exposed to a heat high enough to expel the moisture. While the charcoal was still warm, the corn was poured in and the whole topped off with another inch of charcoal. While still open it was exposed for thirty minutes to a gentle heat (43° C.) and then carefully sealed. This was on December 23, 1906. On May 23 of the present year (six months later) the two jars were opened, and 100 seeds taken from each, a like number from the closed cannister, and all were placed in the germinators. These tests were concluded on June 1, and we obtained from the heated jar containing the charcoal a 91 per cent germination, from that only hermetically sealed a 28, and from the cannister a 36 per cent germination. The tests were sufficient to demonstrate that hermetical sealing, unless precautions are taken to expel the very moist atmosphere, is detrimental rather than beneficial to the seeds. The unusually good showing (36 per cent) of the unprotected seeds was due in part to excellence of vitality at the start, and still more to the abnormally low reading of the hydroscope and the high, dry winds which marked the first quarter of the present year. Since the beginning of the wet season, however, the exposed corn has deteriorated more rapidly than that which was merely sealed. At the conclusion of the tests the heated corn was treated anew in the same manner and will be kept for future tests of this method. The average life of most garden and field seeds in temperate climates, without other provision than a cool, clean, dry bin, is four years, the extremes being two to ten years. These tests demonstrate the possibility of preserving all seeds even under the trying conditions which prevail in these islands. It is obvious that the importation of seeds of good quality is an indispensable factor to successful preservation, and that the cost of the method of seed preservation herein described would be great for large quantities of seeds, as they would have to be placed in small jars and much charcoal would be required. Large containers might be used, but as it would be difficult to fully exhaust the damp air and to promptly seal such containers, the danger of loss would be increased. The tests which we have made indicate that seeds from temperate countries can be preserved in the Tropics by the method described, although the use of this method on a commercial scale may not always be practicable.

SEED TESTING.

Our seed distribution began October 10, 1906, and all seeds were tested prior thereto. Most of the small seeds were received from Europe and came packed in hermetically sealed zinc cases. A number of varieties of peas, beans, and corn were received from American dealers and came in empty spirit casks.

Of the 23 varieties of vegetable seeds received from Europe, all, with the exception of lettuce, showed an excellent percentage of germination, notwith-

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standing the fact that they were seeds of the preceding year. The failure of the lettuce is possibly attributable to the exposure of this seed to excessively high temperature during shipment.

The American peas, beans, and corns all responded quickly to germination tests, with the exception of the Lima beans, which proved to be defective.

The office germination tests were in every case confirmed by field trials at the Singalong experiment station. The two defective varieties were also given field tests, but were not distributed.

We have received a smaller number of complaints about defective seeds than in previous years. Reports have been received, however, that our tomato, pepper, and cabbage seeds were entirely worthless. In a number of cases we have been able to furnish young plants grown from the same lot of seeds to the persons making these reports.

Experiments conducted in Manila show that perfectly fresh seeds of many plants are affected by extremes of either drought or moisture. At altitudes of 4,000 to 5,000 feet these conditions, if accompanied by low soil temperatures, are still more unfavorable for germination. Tomato and eggplant seed planted at Baguio in January, 1904, failed to germinate and were pronounced defective. Early in May of the same year, when the seeds were four months older, and presumably not improved by age, they germinated freely. Undoubtedly the demand for vegetables at Baguio comes at a time which necessitates planting the seeds during the coolest season of the year, corresponding to midwinter in the United States. At this season heavy fogs and even frost are frequently seen, and ice has been reported in the mountains near Baguio. The soil temperature is evidently quite low, vegetable growth is very slow, and seed germination correspondingly uncertain.

The climatic conditions, intelligence of the farmers, and many other things that affect plant growth vary so widely in the islands, and even in the same province, that great care has to be exercised in sending out seeds if favorable results are to be expected.

EXPERIMENT STATIONS.

SINGALONG EXPERIMENT STATION.

SOIL.

The soil at Singalong is very sandy. This is due to the fact that the station grounds face on a large salt estero, or tidal creek, and are only about one-half kilometer from the shore of Manila Bay. Slightly below the surface the washed beach sand formation is clearly visible. The soil is very porous, and the water readily percolates down to the water table, which is, however, very near the surface during the rainy season. There is no place on this station that is over two meters above sea level.

WATER SUPPLY.

There is a 6-inch artesian well at Singalong in which the water comes within a meter of the surface. Just below the water level in the well it is connected across to an overflow cistern having a capacity of 15,000 gallons. A 6-inch duplex pump is so connected that it will take water from the well, from the cistern, or from both, as desired. A storage and pressure tank with a capacity of 6,000 gallons, elevated 8 meters, furnishes the means of securing water on all parts of the grounds, to which it is carried through a system of pipes beginning with 3-inch pipes and running down to 1. A small 8-horsepower steam engine is used for running this pump, and from about the middle of December until the middle of May it is operated every day to furnish water for irrigation purposes. On account of the limited water supply no flooding can be done, but the water is conducted through trenches which have been puddled to prevent rapid waste in the sandy soil.

CROPS.

Guinea grass.—A few roots of this grass received from Honolulu, 20 of which arrived in good condition, were propagated by division. It has proved very successful, and at the present time there is about half a hectare of plants growing at the Singalong station grounds. In addition, a sufficient surplus has been grown to make liberal experimental plantings on the stock farms at La Trinidad and Alabang, from both of which places come encouraging reports

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of its vigorous growth. A small amount of the tops have been used as green forage, and were relished by the animals, being eaten up clean by both horses and cattle. Although two cuttings of forage have been made from the original plants, and a third is well advanced toward maturity, they give no indications of exhaustion. The necessity for frequent subdivision for propagation has prevented the taking of any yield records. It can only be said, therefore, that appearances indicate a large forage yield per acre.

Paspalum dilatum.—This water grass, seeds of which were procured from Australia, has made a very satisfactory growth. It is reputed to endure more drought than the species of *Paspalum* found in the Philippines, and we shall propagate it extensively during the coming year.

Corn.—On account of the small size of the station grounds, it has been found impracticable to grow more than one variety of corn at a time. The principal variety produced this year was Moseby, the seed of which was obtained from Mississippi, in which State it was originated. This corn has retained its characteristics in succeeding generations better than any other variety we have so far grown. It is a white corn with very deep grains and small cob. These characteristics are just the opposite of most native corns, and the Moseby would no doubt be excellent to cross with them. Several small lots of seed were selected, cured, tested, and distributed in the islands. No yield tests were taken, as most of the corn grown was sold to be used as roasting ears. Small plantings of sweet corn were made, but were very much dwarfed and became mixed with the Moseby corn. Corn grows best here in the dry season with artificial irrigation. The growing of green corn for the Manila market might be made a thriving and profitable industry. There is a large demand for this product, and there are many locations along the Pasig River where an unlimited supply of fresh water is available. In some of these locations pumping machinery is already installed for the irrigation of zacate.

Broom corn.—Renewed experiments were made with this sorghum during the year and some very fine samples of "brush" obtained. Our demonstrations have advanced far enough to indicate that broom corn may be grown as a succession crop almost throughout the year. Brush which was taken during the rainy season does not appear to discolor or stain, and this will permit of production for broom making over a long period.

Sorghums.—The original types of sweet sorghum, as well as the nonsaccharine Kafir corn, Milo maize, and Egyptian corns introduced by the bureau, have all been grown at the Singalong experiment station grounds, but owing to the limited area available and the necessity for close planting, these various sorghums have interbred freely. We now have a large number of natural hybrids, which, in addition to the races mentioned above, have a strain of broom corn, as well as a sprinkling of *Sorghum negrosensis*, a native species which has been grown to determine its forage value. Some of these hybrids are remarkably robust, and more productive of forage than any of the pure races. In yield and quality of seed they seem defective, and it will be necessary to reimport pure seed and cultivate the different varieties on separate farms, in order to continue the production of pure seed for distribution.

Velvet beans.—We have continued planting the Florida velvet bean (*Mucuna utilis*) at all seasons, and while it never fails, it is a slow grower, requiring about five months to reach maturity. The beans are borne in small clusters at the base of the vines, where they never completely dry and are difficult to harvest. They have not proved very prolific and the cost of producing seed is considerable. The best result obtained with this crop during the past year was when planted in the same rows with sorghum and Kafir corn. The bean vines run up the sorghum and both are then cut for green forage. This pruning seems to strengthen the beans in the further production of runners.

This bureau has brought into cultivation a native velvet bean, *Mucuna lyoni*. This was a wild and, until recently, undescribed species found in the Pampanga Valley. It is quite distinct from the Florida velvet bean, and is readily recognized by its larger and much lighter-colored leaves, large woody main stems, and abundant succulent branches. The flowers, instead of being dark colored and growing in closely compacted bunches, are pure white, or greenish white, and hand in long, open racemes. From the three original seeds obtained, which weighed two grams, 7.04 kilos of seed were grown. The three plants were trained upon trellises, and were stimulated in every way to the maximum of production. From a subsequent field test alongside of the Florida velvet bean, and grown under like conditions, the product of the Philippine velvet beans was the greater. It has now been grown to the third generation, is losing the wood-

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iness of the main stem, and continues to be very prolific. *Mucuna utilis* is edible, but so unpalatable as to be classed only with stock foods. *Mucuna lyoni*, although it cooks rather dry, is quite palatable and a great improvement on the former. Tests made at the bureau of science proved this bean to be without any trace of hydrocyanic acid, a poison which often occurs in tropical beans in deleterious quantities. Samples of the seed have been furnished the Bureau of Plant Industry of the United States Department of Agriculture in sufficient quantity for field tests in the Southern States and such other investigations as they may desire to make. In general vigor and productiveness of forage, as well as seed, it far surpasses *Mucuna utilis*. Inasmuch as soil-renovating crops also serve to repress cogon and other gross weeds, and furnish both animal and human food, these crops must play a highly important part in Philippine agriculture. This fact makes the discovery of *Mucuna lyoni* an economic benefit of signal value.

Sesamum or Liñga.—Further work was done with this oil-seed crop to determine the season when its planting would be attended with least risk from loss. In rich soils it makes so rank a growth that it is apt to lodge during heavy rains when approaching maturity. On the other hand, a liberal supply of water is necessary for the production of a good crop. The first trial made at the opening of the dry season resulted in a dwarfed growth and a very inferior crop. From a planting made in June, 1906, we harvested a grain product at the rate of 473 kilos per hectare. Some grain was lost by lodgment from the heavy rains of September, but the amount was small and certainly less than one-fifth of the total. From this it seems better to take the risk of loss from rain rather than to invite the more complete failure resulting from drought. The Philippine Products Company has declared sesamum to be the most tractable oil seed which comes to their hands, and it is our aim, by further experiments and distribution of seed, to promote this industry as a promising source of revenue to the small native farmer.

Carolina golden rice.—As the result of favorable preliminary work, further experiment and a wider scope of introduction were carried on with this grain. A plat of it sown in drills 18 inches apart on July 13, was cultivated very much as corn, had no artificial irrigation, headed up in ninety days, was harvested in one hundred and twenty days, and yielded on thin, sandy land at the rate of 52 cavans to the hectare. In the rice experiments, one of the aims of the bureau has been to reduce to something like uniformity the great number of varieties of rice grown in these islands. In Carolina golden we have found a variety which is of good size and form, very early, prolific, of excellent milling properties, and uniform in ripening. It is a lowland rice, but can not be transplanted to advantage. The native farmer being accustomed to transplanting all lowland rice, the distribution of Carolina golden must be made with caution and preceded by educational work pointing out the radical changes in method of planting required. As rice is the most important of our cereal crops, and as Carolina golden appears so nearly to meet the standard of requirements, it is desirable that we make long continued experiments both with this and other varieties.

Tanias.—The single bulb of this promising variety of "taro" or "gabe" obtained from Porto Rico three years ago, has proved very prolific and has furnished sufficient "sets" to permit of planting more than 150 linear meters of rows. From this it appears that a considerable public distribution can be made next season. Our previous experience, that this species of *Xanthosoma* will produce a good crop with less water than the *Colocasias* grown here under the name of "gabe," is confirmed, and the indications are that this plant will be a useful addition to our list of staple food crops not dependent upon irrigation.

Venezuela black bean.—This is a species of *Vigna* received under the above name from Herbertshoe, New Guinea. It appears to be one of the cowpeas, and closely resembles the "clay pea" of Louisiana. After three months it is yet unproductive but has made phenomenal growth of vines.

Avocado pear.—The largest tree at the Singalong experiment station flowered quite freely during the past season but failed to set any fruits. Anticipating this as a possibility, a considerable number of flowers were carefully pollenated by hand. As this method also failed, the indications are that the plant is possibly self sterile. During the year other plants have attained to flowering size and the result of cross-pollenation is awaited with much interest. A few avocado pear trees planted at Lamao made such superior growth that we have recently set out an orchard of half a hectare at that station.

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Vanilla.—Some vanilla plants brought here a few years ago were lost in the typhoon of September, 1905, and in view of the depressed condition of the vanilla industry no efforts were made to reintroduce the plant. A few were received as exchanges about a year ago, and were planted out at the Singalong experiment station. They have grown exceptionally well. Some of the plants have made leaders 3 meters long and are quite robust. This rate of growth is unusual, even in Vera Cruz, where the plant is supposed to attain the highest degree of perfection. It probably indicates that the conditions about Manila are very favorable for vanilla growing and that the distribution of these plants is to be recommended.

Monstera deliciosa.—Three cuttings of this unique and excellent fruit-bearing vine were received from Brazil nearly one and one-half years ago. One died and the other two remained dormant for eight months, but then started to grow. They are now well rooted, are making a strong growth, and there is reason for believing that the introduction will prove successful.

Pineapples.—A few of the Natal pineapples brought here from Durban have fruited. In tenderness and in freedom from fiber and core they are a marked improvement over the Bulacan variety which has been grown at Lamao. We have lately secured 200 plants of the variety grown in Marinduque and have planted them out along with the West Indian varieties now growing at Singalong. This makes five kinds we now have growing at this station—Smooth Cayenne, Ripley, Red Spanish, Natal Canning, and Marinduque. The trials proposed include fertilizer and irrigation tests, determination of the relative yields and quality of fruit of the different varieties, and the production of plants for distribution.

Coffee.—The small planting of maragogype hybrid coffee made in Lipa, Batangas Province, four years ago produced last year a first crop of a little more than 1 pound of berries to the tree. Although not immune to the leaf blight, it is so strongly resistant to the disease and has survived so well in that pest-afflicted region that the berries were all quickly bespoken by old coffee planters of the district, quite a number of whom have planted seed beds for the purpose of renewing their plantations. As this seed was quite unfit for planting, it is difficult to avoid the conclusion that some future disappointment is in store for these planters whose enthusiasm has outstripped their knowledge or wisdom. The few trees at the Singalong experiment station are of the same age, and are equally as good as the plants at Lipa, notwithstanding the unfavorable environment.

Cassava.—Small plantings of the native white cassava were made with a view to testing its growing period, yield, and composition. This variety seems to reach maturity in about ten months. No satisfactory yield tests could be made on account of the constant depredations of hogs running at large in the city at night. A number of samples analyzed contained about 28 per cent of starch, which is 2 per cent more than is credited to this root in Florida, where it is grown extensively for the manufacture of starch. Cassava is now receiving some attention from prospective manufacturers of starch and tapioca in this country. The following food analysis of cassava shows it to be a valuable root crop food, especially for hogs and cattle.

CASSAVA ANALYSIS.

	Per cent.
Protein	1.5
Carbohydrates	25.2
Fat	.2
Fiber	2.3

Native squash.—Renewed plantings were made this year with a native Melopepo secured the previous year in La Laguna Province. The quality of this fruit is unexcelled by any known native or exotic cucurbit, but the latest trials confirm its scanty bearing habit, and the defect is one we have been unable to overcome through cultivation. On this account further work will be discontinued. The brilliantly variegated greenish yellow leaves of this plant are so unique as to suggest its cultivation as an ornamental plant.

Tongo.—This is the native name of a most excellent yam brought in February of the present year from Mindoro. The tuber is not so nearly spherical as that of the variety found in Luzon and is slightly less glutenous than our common yam. It has much greater mealiness when cooked than *ñame*, *tugui*, or any of the yams in common use here. In view of the very great confusion

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existing in Dioscorea, and pending Doctor Prain's revision of the genus, it would be premature to say that this is a new species.

As it was obtained under forest conditions it has been a little slow in adapting itself to cultivation in Manila, but since the advent of the rains has taken a new and more promising start.

Condol (*Benincasa cerifera*).—This was grown as a trellis plant and from a single vine 62 fruits were obtained. Chinese buyers are always on the alert to procure this fruit. The average yield of a single plant of Benincasa is about 6 fruits, and the extraordinary yield cited above was due to the exercise of a slightly modified system of pruning practiced, though rarely, by Filipino gardeners. It consists merely in splitting the main stem and leading branches and inserting wedges, which has the effect of checking leaf growth and developing flowers. In addition to this "pinching back" was practiced with the result mentioned above.

Parameria vine.—Cuttings of this rubber plant, brought from Mindoro in February of the present year, successfully rooted and are now growing nicely. The seeds of Parameria are small and developed by that method of propagation tedious, hence the experiment of determining if, by the use of cuttings, rapid multiplication could be secured. The botanist of the bureau of science was unable to determine the age of the samples of vine brought in, but the indications point to its very early development, probably in one or two years from cuttings if planted under suitable forest conditions.

Laboratory analyses show the dry bark of this vine to contain 4.52 per cent of pure caoutchouc. It is, however, associated with oils and resins, which when extracted leave the rubber tacky and of low value unless vulcanized. The vine is too small to be successfully tapped, but the uncontaminated rubber can probably be obtained by a centrifugal or other mechanical process. As 1.48 per cent of the live weight of the plant is rubber, and as small parcels of the wild vine produced at the rate of 4 tons per acre, there is a theoretical yield of 120 pounds of rubber to the acre.

The questions to be determined in regard to Parameria are: First, a suitable extraction process; and second, the time required to secure a crop.

Maguey.—The small plats of native and Hawaiian maguey growing at the Singalong experiment station have continued to flourish, notwithstanding the fact that they are on low, level land, almost at sea level, and where no special provision is made for drainage. During the year all of the Hawaiian maguey was removed to the border of the land, where drainage was possibly a little better than in the center of the plat where it was formerly planted. Part of it was set under the shade of clumps of bamboo and part in the open. Where it had strong sunlight and was not crowded, it has made a very satisfactory growth, the leaves being about a meter long, though it is not yet three years old. The leaves are far superior in shape and development to the native maguey, which has a thin leaf tapering from base to point with such rapidity that the leaves do not attain the desired weight. Both kinds have produced an abundance of strong healthy suckers, which have been distributed.

SILK CULTURE.

Near the close of the fiscal year this bureau, in connection with the bureau of science, started a series of experiments in silk culture.

The results thus far obtained are not sufficiently complete to justify a statement as to the probable success of this industry in the Philippine Islands.

LAMAO EXPERIMENT STATION.

SOIL.

That part of the Lamao forest reserve under the control of the bureau of agriculture is located principally near the shore of Manila Bay and on the Lamao River. A considerable portion of the land now in cultivation is hilly and broken.

The soil is for the most part underlaid with drift boulders, cobblestones, and gravel, and varies from red clay to beach sand, including all varieties of sandy loam. In many places it is so porous that there is difficulty in conducting irrigation water across it without puddling the ditches or fluming. The unused land is overgrown with a dense growth of brush, which necessitates considerable work in clearing and makes cultivation difficult until the roots and stumps have all been gotten out.

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WATER SUPPLY.

The Lamao River has several branches originating in the mountains just back of the station, and they furnish an abundant supply of water to irrigate all of the land now in cultivation. Irrigation water is secured with perfect ease, requiring only a temporary dam of boulders taken from the stream and a small ditch leading down to the fields.

BUILDINGS.

All buildings at this station are of a temporary nature except a small office near the bay shore. Toward the close of the year a large nipa house for the superintendent was begun at Station One near the beach. As there is no other place in this vicinity where botanists, foresters, and other scientific investigators can find suitable quarters, sufficient room is being provided to accomodate them in the superintendent's house.

White ants are numerous at Lamao, and buildings, bridges, and other permanent structures require constant repairs to keep them in order.

CLEARING AND FENCING.

During the year about 4 hectares of land have been cleared, fenced, and brought into cultivation. All new land put under cultivation requires thorough fencing on account of wild hogs, which are very numerous and constantly destroy nearly all kinds of cultivated crops.

NURSERY.

There was considerable decrease in nursery work on account of the fact that the demand for economic and ornamental plants was not as great as had been anticipated. The facilities at this station for the propagation of forest trees, ornamental plants, and flowers are almost unlimited. It is believed that the growing of such plants might be greatly encouraged by the production of a liberal supply at Lamao for free distribution to municipalities and schools throughout the islands.

CROPS.

Coffee.—Among the more interesting things growing at this station during the year might be mentioned a plat of coffee. A part of this has been irrigated and has made an excellent growth, while the unirrigated portion has done only fairly well.

Rubber.—A planting of 400 Brazilian rubber trees was made in the brush land with a view to determining whether or not they are capable of making satisfactory growth without clearing the land. These trees have done very poorly, and will probably have to be removed to prevent their entire destruction. A few trees of the Mexican rubber planted at this station under more favorable conditions have done quite well.

Avocado pear.—Avocado pears have done especially well, and a plat containing almost one-half a hectare has been planted out.

Maguey.—In addition to the 20,000 maguey plants previously put out at this station, 5,000 Hawaiian sisal suckers have been planted during the year. All of the maguey is making a very satisfactory growth, and in the course of two years more there will be an abundant supply of suckers for distribution. This crop has proved a very easy one to handle on these broken hill lands, where nothing more was done than to cut down and burn the brush, set the plants out at the proper distances, and afterwards keep the weeds and sprouts cut down to avoid shading the plants.

Abaca.—Mention has already been made of 700 abaca plants produced from seed and set out at this station. Abaca of other varieties will be added and grown under the same conditions, so as to test their comparative merits.

Kapok.—An experimental planting of young kapok trees was made at Lamao in thin but uncleared forest. The trial was made to determine if this plant would hold its own in competition with the native woodland or jungle growth. The trees have survived the first dry season, which, under such conditions, was perhaps all that was to be expected. Seed plantings were also made to determine the relative loss or gain in time over planting truncheons or cuttings of the stem or branches. This seed sowing was made in mid September, 1905, and at the close of the present fiscal year, when only 20 months old, a number

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of the plants are over 6 meters in height and have a girth measurement of 40 centimeters at a height of 30 centimeters from the ground. Some of the trees planted at Lamao produced pods in less than two years from the time of planting. This information is of considerable importance, as there are localities where kapok does not occur, and in any case the procuring of large cuttings and their transportation to distant points would deter many from planting. This experiment has definitely established the fact that planting upon a large scale may be cheaply and expeditiously effected by sowing seed.

Pineapples.—The Bataan pineapples growing at Lamao have been irrigated during this year and have produced a fair crop of fruit, 700 having been shipped to Manila. This native pineapple is a vigorous grower, and while defective in size and flavor, promises well for canning purposes.

Bananas.—Several varieties of native bananas, as well as the Hawaiian dwarf, are growing at this station. Enough plants have now been produced to put out regular plats, and during the year experiments as to yields, quality, irrigation, etc., will be made.

Miscellaneous.—An experimental collection of various other tropical and subtropical trees and plants was put out at this station. Many of these have done so well that further plantings will be made during the coming year.

Among the plants of special interest and economic importance which we have introduced and succeeded in getting well established are the red Trinidad guava, American Genip, Australian chestnuts, and Pleiognum. The lemons, grape fruit, and grapes originally planted at the third station on top of the mountain were threatened with destruction and were brought down to the first station. They are all doing much better and promise to be quite successful. The three varieties of lemons growing are the Lisbon, Eureka, and Sicily. After repeated trials we have failed to establish at either Manila or Lamao the Durian or Mangosteen fruits from the southern islands.

Small numbers of the following trees were received and planted with the following results: Calabash tree, good; Anona cherimola, dead; Castanospermum australe, good; Guava araca, good; Macadamia termifolia, dead; Casuarina equisetifolia, very good; Durio zibethinus, fair; Pleiogyne solandra, very good; Enocarpus edulis, fair; Burbank plum, badly attacked by some leaf-eating insect, plants old; Kiefer pear, promising; many varieties of European and American grapes, but mostly varieties grown in Middle States, not making a very encouraging growth.

BAGUIO EXPERIMENT STATION.

LOCATION.

This station is located about 5 kilometers north of the town of Baguio in the Trinidad Valley, which is a crater-like depression drained by the Balili River, which passes through this valley, bounds the farm on the east side, and makes its exit through a notch on the north side of the valley. The altitude of this section is approximately 1,500 meters.

SOIL.

The soil is made up of decomposed shales and sedimentary lime rock found abundantly around the mountain sides and in the valley. It is liberally intermixed with silt containing some sand. The soil of the entire farm was evidently formed by the action of the river. It is not at all fertile, and will require a judicious application of manures and chemical fertilizers and the growing of leguminous crops in order to bring it up to a satisfactory state of productiveness.

CLIMATE.

This province has a temperature reaching the frost line in midwinter and a rainy season a little earlier than that of the west coast of the islands—that is, beginning in May and ending in October. On account of these facts this section of the Philippines promises to be a favorite resort for those seeking health and pleasure. Ever since the summer capital of the islands was established at Baguio there has been considerable demand for fruits and vegetables during the dry season, especially during the months of March, April, and May. The climate at this season is delightful to the tourist, but in order to produce vegetables to be available at this time of the year they have to be planted early, when the daily minimum temperature goes down almost to the frost line. This

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has proved to be a condition making it possible to grow all of the early spring vegetables of the United States in this section, but those things which flourish best during the summer weather, such as corn, can not be successfully produced at Baguio during these months.

WATER SUPPLY.

The water supply for the station was secured by constructing a temporary dam of boulders in the Balili River and conducting the water in an open ditch which follows the road through the valley.

OPERATIONS.

This station up to the beginning of the past year was operated in a small way with a view to obtaining experimental information with reference to the crops suited to this section of the islands and incidentally for the production of vegetables for sale to those frequenting this resort during the dry season.

The plant breeder of the bureau was sent to Baguio in February, 1906, and was placed in charge as superintendent at the beginning of this fiscal year. The operations of the station have since been greatly increased. The irrigation system has been extended, sod lands put under cultivation, roads built, and drainage ditches put in. An extensive system of variety tests, germination experiments, plant-breeding work, fertilization, cultivation, and rotation has been established. Practically every crop in the Philippines is now being tested at Baguio, and other economic plants are being brought from different parts of the world for trial.

PLANT BREEDING.

The present superintendent has not been at Baguio a sufficient time to obtain definite results in his plant-breeding work. The hybrids thus far produced have not reached the desired characteristics, being mostly in the second generation.

Considerable attention has been given to the improvement of the wild Rubus and wild strawberries, as these plants are already growing in great abundance in the vicinity. If they can be improved in productiveness, size, flavor, and resistance to disease by hybridizing, cultivation, or otherwise, they will prove a valuable addition to that section. New types of Rubus and Fragaria are being evolved, and considerable improvement has already been produced in the species of wild raspberry which has been brought into cultivation.

California lemons and oranges have been grafted on to the native citron and promise excellent results. This work is of special value in view of the fact that the native citron is already acclimated to that section and is able to withstand the heavy rains of the summer months. This citron can also be propagated by cuttings and shows resistance to fungous diseases.

Wild blueberries placed in cultivation have improved greatly in size and flavor and the bearing period has been very much prolonged.

A tomato which is thought to be resistant to damage by excessive rainfall has been produced by crossing the native tomato with an improved variety.

By a system of root grafting and training, young mulberry trees have been made to produce fruit within a few months, and the berries appear to be much improved in quality.

There are many other lines of plant breeding in progress which will be reported on more extensively during the coming year. Free use is being made of selection, crossing, hybridization, budding, grafting, and cultivation in the improvement of plants.

CROPS.

Potatoes.—Potatoes have been the subject of considerable experimenting, as this is one of the staple crops grown by the Igorots. Four varieties have been tested during the wet and dry seasons, and while the yield has been rather small the quality was excellent. The low yield was no doubt due in a large measure to the poverty of the soil, which can be overcome by proper fertilization. This is one of the most promising crops for the Province of Benguet.

Vegetables.—Nearly all of the standard varieties of vegetables, including peas, beans, tomatoes, spinach, cabbage, turnips, carrots, lettuce, kohlrabi, peppers, radishes, eggplant, beets, cucumbers, native onions, squashes, garlic, and mustard have been successfully grown at this station during the past year. The following vegetables have been grown in a small way and most of them are worthy of further consideration: Rhubarb—Half dozen plants, growing nicely.

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Celery—Grows slowly, is fibrous, does not blanch satisfactorily. Brocoli and Cauliflower—Varieties grown not satisfactory, better varieties will probably succeed. Artichokes—Very young, but doing well. The seeds of muskmelon and watermelon failed to germinate.

Small fruits and berries.—Strawberries—Only a few varieties thrive and set fruit. The American varieties without runners have given best results. One of these varieties is an everbearing, large fruited, somewhat crested variety of excellent flavor, with firm dark red fruit; the other is a smaller variety with bright red, oblong berries. The names of these two varieties are not known. The French variety, "Reine de prairie," the principal one now in cultivation at Baguio, is a small everbearing variety with an erect stem. It has given only a light yield, but can probably be improved in this respect by proper fertilization. Raspberries—A few plants of American and Australian varieties are growing nicely, but have not yet reached the fruiting age. The native red, yellow, and black raspberries are now being cultivated with a view to their improvement and are fruiting freely; three plants were recently received from the United States and are to be used in cross breeding with the native varieties.

Fruits.—Citrus fruits—About 2,000 seedlings and cuttings of the native citron are growing nicely and are to be used in budding and grafting work with improved varieties of oranges and lemons. Deciduous fruits—The apple, pear, plum, quince, apricot, and peach trees bloomed and set fruit which dropped very early. One Australian chestnut is reported as in bloom and one English walnut tree is alive and gives some promise of growing. Grapes—A number of imported and native varieties are growing fairly well, but are too young to determine results; two of the Concord vines flowered, but failed to set fruit. Japanese persimmons thrive very well. Loquots are promising. Coffee—The nursery contains a large number of seedlings. Coffee grown from cuttings promises to give fruit much earlier than that from seedlings. Figs—Cuttings are growing nicely.

Field crops and forage plants.—Corn—White dent variety produced very small yield in rainy season, the only time of year when this crop succeeds at all. Sorghum—Grows very slowly, but produces a fair crop of forage in six or eight months. Millet—Fairly satisfactory. Oats—The best green forage crop yet grown; sown in October they yield a fair cutting by March, but do not produce grain. Sorghum and oats have so far furnished the bulk of the green forage produced at this farm. Rye—Makes light growth, but produces small amount of grain. Barley—Generally unsatisfactory; chevalier variety grows best, but produces no grain. Wheat—Practically all varieties failed except red Fife and Triticum durum, which produced some grain. Flax—Very promising; grows well during both rainy and dry seasons; seeds freely and fiber seems of excellent quality. Castor bean—Thrives well and fruits at all seasons. Sunflower—Fairly successful. Alfalfa—has given two cuttings in five months; in flourishing condition; promises well; the plats have not been inoculated, but show a small number of root nodules. Vetches—Smooth vetch has made fair growth; seeds abundantly and promises excellent results; hairy vetch shows a more fibrous growth, but does not produce seeds. Clovers—Volunteer plants of red, white, Trifolium repens, and Medicago lupulina have made vigorous growth and seem worthy of further planting. Sanfoin—Slow grower; not promising. Bermuda grass—May be regarded as native as it grows freely throughout the Trinidad Valley and flourishes better during the dry season than any grass there. This will probably be the standard pasture grass of the higher altitudes, like Baguio, as well as for most of the lowlands in the Philippines.

OBSTACLES.

In addition to the poor soil, cold seasons, and heavy rains the plants grown at this station have had to withstand the ravages of a large number of insects. These insects attack practically all of the vegetables, fruits, berries, and even field crops. Fungous diseases have also caused much damage to potatoes, tomatoes, peas, and a few other crops, but have generally been susceptible to control by spraying with Bordeaux mixture. Much of the land was in sod, and it has required a great deal of labor to bring it in cultivation and provide the necessary irrigation and drainage. The conditions at this station are probably more favorable for growing many crops and vegetables introduced from the United States than any other farm operated by this bureau. It is located in the heart of a section occupied by one of the primitive tribes of the islands, and

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every success there means much more than it would in the more enlightened sections. On account of the remoteness of its location the operation of this farm is necessarily expensive, but a reasonable expenditure seems justifiable in view of the possibilities existing. Baguio is one of the stations from which we expect great things in the future.

BUILDINGS NEEDED.

It will be necessary during the coming year to erect permanent buildings at the Baguio station, as the temporary grass structures used heretofore are now practically useless on account of decay. It seems especially desirable to construct a greenhouse, in which seeds can be propagated during the cold season for transplanting in early spring.

LA CARLOTA SUGAR FARM.

LOCATION.

This farm is located in the foothills of the volcano Canlaoan, about 6 kilometers east of the town of La Carlota, Occidental Negros. It is in the best sugar-growing province of the Philippine Islands, where it was established by the Spanish Government as an experiment station for the study of the sugar industry.

SOIL.

The land at the La Carlota farm is undulating on the lower levels and rather hilly farther up the mountain sides. Much of it is underlaid with drift boulders, cobblestones, and gravel, with a superposed stratum of soil of black volcanic matter resembling in many respects the lands of the Middle Western States. Along the streams the soil is all washed off of the rocks, so that in many places near the streams cultivation is out of the question. The soil of this farm is considered excellent for sugar growing, and the results obtained may be taken as a fair sample of what can be accomplished on the best sugar lands of the islands.

WATER SUPPLY.

A river of considerable size bounds the farm on one side, and there are several smaller streams within the limits of the farm. A dam has been constructed in the larger river and a canal built which carries the water a considerable distance from the stream where it enters a tunnel through which it passes down to the sugar mill where it is used to produce the power required for milling the cane produced on the farm. A branch of this canal carries the water out farther onto the farm, where it becomes available for irrigation purposes. Much trouble has been experienced in attempting to use the water of this river for irrigation purposes, as the hacenderos having mills farther down complain that there is a lack of water for power when it is used for irrigation purposes higher up the stream.

EQUIPMENT.

The sugar manufacturing equipment on this farm is of the antiquated type in use in the West Indies about forty years ago. It consists of a 3-roller mill operated by water power and a train of open kettles, through which the juice passes as it is being made into sugar. This equipment was found on the farm when it was turned over to the bureau of agriculture. It has been operated there because of lack of means to purchase any other, and for the reason that the condition of the sugar industry in the Philippines is not such as to encourage a large expenditure in equipping a sugar experiment station.

OPERATIONS.

Up to the present time the farm has been operated only in a small way, less than 100 hectares of cane having been under cultivation. However, this is more than can be handled expeditiously with the milling outfit now provided, as was

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shown during the past season, when it required from early in December until April 21 to mill the small quantity of cane grown. An effort has been made to run the farm on an economic basis, according to the methods generally practiced by cane growers in these islands rather than to undertake any elaborate system of experiments which would have cost more money and given less returns. In fact the great bulk of the crop consists of native varieties of cane, although we have grown small plats of imported varieties. The farm has not been so laid out that the different plats would be comparable, nor has much of the required equipment for experimental work—such as wagon scales and technical apparatus, required in the sugar house—been provided. An attempt has been made to estimate the crop of cane as accurately as possible and to determine the yield of sugar by actual weights. The best yield yet obtained was from a field of first rattoons, Louisiana striped cane, which produced at the rate of 118½ piculs of sugar per hectare, or 3.3 tons per acre. Most of the imported varieties obtained do not seem peculiarly adapted to the conditions of these islands. Many of these varieties are canes requiring a long period of growth for their full development. As all canes in the Philippine Islands generally mature off early in the dry season—beginning from November to January—they make the entire growth in from eight to twelve months, averaging not over ten. In other countries many varieties of cane frequently grow from fourteen to eighteen months, and when brought here seem to persist in that habit. The result is that they must be planted very early or they will not mature in time to be milled along with the native cane. This necessitates planting them as early as October or November, in order that they may reach full growth. By the end of the dry season they have attained a height almost equal to the native cane at maturity, and while the stalk is of good size near the ground, it tapers off rapidly and becomes very small near the top. When the rains begin the new growth at the top of the stalk develops to normal size, but having such a small weak portion below to support it, falls down and becomes badly tangled. Once down, and in contact with the ground, it begins to sprout, which destroys to a large extent the sugar-making value of the cane. In some cases it is split or broken off, and stalks so injured begin fermenting and ultimately decay or become an easy prey to insects and ants. Finally, when the harvest comes, these improved varieties of cane frequently give very poor results as compared with the small native types. It is possible to overcome many of these difficulties by better systems of cultivation and abundant irrigation throughout the dry season, so as to keep the cane in a healthy growing state. Another notable feature in connection with the varieties of cane grown is, that while the native canes will yield a No. 2 Iloilo sugar and rarely run below No. 3, the improved varieties, and especially the plant cane, produce No. 4.

PROPOSED CHANGES.

The work being done with sugar at La Carlota farm is altogether unsatisfactory, and it would seem better to convert this farm into a general experiment station rather than to continue it as a sugar farm. If such a station were to be established the improved and native varieties of cane could be grown in sufficient quantities for milling tests and for general distribution of seed on the sugar farms of this and other provinces throughout the islands, many other crops that this bureau recommends for crop rotation in connection with sugar growing could be planted, and sufficient information gained to determine the adaptability of such crops to the soil and other conditions of Negros and similar sugar-growing provinces.

It would certainly seem desirable to continue work with maguey at La Carlota. About two hectares of Hawaiian sisal have already been planted and it is growing nicely. A liberal supply of abaca was planted on this farm three yeas ago, a part of which was set out under shade and part in the open. This experiment has been of value as shown by the fact that the abaca planted under shade is doing quite well, while that planted in the open is nearly all dead and the remainder very small. Excellent work could be done with rice, such as the growing and testing of varieties, yields, effect of fertilizers, and the operation of machinery—such as threshers, hullers, etc. It is not probable that tobacco could be successfully grown at La Carlota on account of the quality of land and nearness to the sea. This farm ought to be particularly suited to live-stock work, especially with cattle, hogs, and goats, great numbers of which could be maintained with but very little cost other than the fresh green foods produced

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on the farm. It could also be used as a base for the operations of the forces of this bureau working in the suppression of animal diseases and at times might be available as an inoculation station.

DIVISION OF ANIMAL INDUSTRY.

This division includes the veterinary control work, the serum laboratory, the dairy farm at Alabang, the Trinidad stock farm at Baguio, and all general investigations in animal industry. It was formed as a division of this bureau by act No. 1407, in which provision was made for the transfer of the veterinary force from the bureau of health to the bureau of agriculture.

CONTROL WORK.

RINDERPEST.

Most of the work performed during the year has been that of the control of rinderpest, which has been prevalent in a majority of the provinces and still prevails in many localities. The severest outbreak of the year was experienced in the province of Bantangas. The disease appeared in the municipality of Bauan the latter part of June, 1906. No report of it was made until July 31, on which date the provincial governor wired the executive secretary. A veterinary force was sent to Batangas, and after almost two months' hard work brought the disease fairly well under control. Remnants of the outbreak still exist, however, in the mountainous sections and in adjacent provinces, to which it spread despite all efforts to stop it. While no other alarming outbreaks have occurred at any one time, serious losses have been sustained in many of the provinces by the repeated appearance of this disease.

It seems highly probable that rinderpest has not prevailed to any greater extent than in former years, but with the district organization and crop-reporting service prompt reports are sent in before the outbreaks become general. This fact, together with the reduction in our veterinary force, previously mentioned in this report, has made it impossible to respond to all calls for help. Even the agricultural inspectors have devoted nearly all of their time to the control of rinderpest. The work has consisted largely in serum inoculation of the affected and exposed animals, segregation, the enforcement of such quarantine measures as could be secured through local officials, and a campaign of education of the people in the nature and rational handling of this disease.

A total of 16,495 carabao and cattle have received the serum inoculation, with 269 deaths, or 1.6+ per cent. The very best of results have been obtained in every instance when the serum method was employed, and it never produces the disease.

Simultaneous inoculation was given to 44 animals, with one death, or 2.1+ per cent.

The greatest economy has been exercised in the use of serum, as only 3,746 bottles have been available for use in the provinces this year. It has been the practice to quarantine infected districts where possible, but the quarantine measures have been in the hands of the local authorities, who have not in all cases fully realized the value of such measures. In the absence of any insular sanitary law or quarantine measure we have been unable to keep the previously infected districts free from the disease on account of the constant movement of live stock from infected to noninfected districts.

During the rush of inoculations made in Batangas Province from August to November, the demand for serum was so great that quite a number of infected bottles were sent out and used, with the result that an alarming number of abscess formations followed the inoculations. The matter was brought to the attention of the bureau of science, which, at that time, had full charge of the serum manufacture. On January 1, when the serum herd was transferred to this bureau, the bureau of science was experimenting with the centrifugation and filtration of the serum to insure its freedom from infection. Serum thus prepared was so improved in appearance and gave such excellent results that permanent arrangements have been perfected by which all serum has since been prepared in this way. So far as is known now, not a single ulcer has since resulted from filtered serum. It is also highly probable that its immunizing value has been greatly enhanced, as formerly it often underwent decomposition in the bottles so that it gave off a decided stench on opening them.

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HOG CHOLERA.

Hog cholera has been reported from nearly every province, and this disease has practically ruined the swine industry in the Philippine Islands. It has not received a great deal of attention, owing to the fact that rinderpest has been consiedred the most important disease which affects our domestic animals and has claimed almost the entire attention of our small force.

GLANDERS.

A total of 2,816 horses in the provinces have been examined for glanders, 87 of which proved positive. This disease is apparently prevalent in every municipality of the Philippine Islands. Owing to the belief among the natives that glanders is a curable disease, very little headway has been made in controlling it. The animals found positive to glanders, in the majority of cases were only quarantined by the municipalities, and if the cases showed a tendency to terminate in a chronic form, they were released and sent back to their owners.

SURRA.

A total of 4,852 horses, cattle, and carabao were examined for surra. 79 of which proved positive. The same measures regarding the positive cases were taken as were adopted with glanders. This disease has not been as prevalent during the year as it was the year previous. The following table shows the number of different species of domestic animals examined for surra:

Animals.	Examined.	Negative.	Positive.
Horses	2,888	2,815	73
Cattle	586	585	1
Carabaos	1,378	1,373	5
Total	4,852	4,773	79

FOOT-AND-MOUTH DISEASE.

Foot-and-mouth disease has been prevalent in a few provinces, but in no instance has it been considered serious.

DISEASES OF FOWLS.

Diseases of domestic fowls have been reported from nearly every province, and thousands of chickens and turkeys have died monthly in each district where the disease has been reported. The principal diseases affecting the fowls are chicken cholera and a parasitic disease, which affects the skin around the head and results in total blindness and, in a large majority of the cases, death.

PORT AND CITY OF MANILA.

INSPECTION ON ARRIVAL.

During the year there have been 93,017 animals inspected on arrival in the port, of which 37,831 were from foreign and 55,876 from interisland ports. Out of the number arriving from foreign ports, 1,744 were quarantined, in accordance with the provisions of the veterinary section of the sanitary code (chapter 24, of ordinance No. 86) city of Manila, on account of the various shipments being infected with rinderpest. The cattle were allowed to land and were quarantined in the owner's corral. Permission was given to the owners to slaughter at the public abattoir such animals under quarantine as were not actually infected with the disease. This quarantine has been of invaluable service to the surrounding country, where it has been the custom of the dealers in Manila to ship the imported cattle immediately on their arrival, as it has prevented the wholesale distribution of the disease by the shipment of these infected herds.

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The following table shows in detail the port inspection:

FROM FOREIGN PORTS.		FROM INTERISLAND PORTS.	
Cattle	35,649	Cattle	2,431
Horses	1,252	Horses	1,876
Carabaos	720	Carabaos	1,403
Sheep	27	Sheep	164
Goats	30	Goats	838
Hogs	142	Hogs	48,230
Other animals	11	Other animals	144
Total	37,831	Total	55,086
Grand total			93,017

Fees.—The sum of ₱15,434.60 was collected as inspection fees and deposited with the insular treasurer.

ANIMALS INSPECTED FOR SHIPMENT TO THE PROVINCES.

Cattle	2,090
Horses	70
Carabaos	397
Hogs	149
Goats	10
Other animals	4
Total	2,720

ABATTOIR INSPECTIONS.

A total of 80,179 cattle, hogs, goats, and sheep were inspected at the public abattoir or matadero in the city of Manila for the purpose of slaughter, of which 76,358 were actually slaughtered and received post-mortem inspection. Of the total number slaughtered 310 animals were condemned and cremated. The following tables show in detail the antemortem and post-mortem inspections and condemnations:

ANTE-MORTEM INSPECTION.

	Number.	Condemned.	Passed.
Cattle	24,301	11	24,290
Hogs	55,660	10	55,650
Goats	202	0	202
Sheep	16	0	16
Total	80,179	21	80,158

POST-MORTEM INSPECTION.

Cattle	20,783	10	20,773
Hogs	55,360	300	55,060
Goats	199	0	199
Sheep	16	0	16
Total	76,358	310	76,048

PARTS OF CARCASSES CONDEMNED, MISCELLANEOUS.

Cattle	7,384
Hogs	12,796
Total	20,180

The carcasses of the cattle were condemned for various causes—such as rinderpest, tuberculosis, and general bruised conditions. The majority of the hogs condemned were suffering from *Cysticercus cellulosæ*, though a few cases of hog cholera and swine plague were found. Parts were condemned for various local inflammatory processes.

Of late *Cysticercus cellulosæ* have been found at the abattoir to such an extent that it has threatened the pork industry of Manila.

According to the pork dealers who slaughter their hogs at the public abattoir, the great majority of the cyst-infested hogs come from the province of Batangas, and some of the smaller dealers who buy from that province almost

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exclusively have been all but forced out of the business in the past thirty days owing to the large number of hogs condemned because of this disease. This matter was referred to the bureau of health for the purpose of finding out the cause of so much infestation and adopting measures that would lessen the prevalence of this malady. As there are no modern sanitary sewage systems in the municipalities in the provinces, swine are looked upon as the natural scavengers, and are allowed free access to human excreta, from which source they become infected. The prohibition of this custom might be practical at least in communities where the parasite is prevalent.

Twenty-one horses have been examined for soundness for the different bureaus and provincial governments, and four horses have been examined with a view to condemnation and slaughter. Twelve horses in the city have been inspected and condemned for glanders, one for surra, one with broken leg, one for lymphangitis, and one for extreme emaciation.

Twenty-one hogs were found dead in the hog market on Calle Azcarraga and seven have been found dead on ships arriving from other ports.

The veterinarians of the bureau stationed in Manila have been called upon by several other bureaus to treat animals suffering from simple diseases. All requests for work of this sort have been complied with without charge.

SERUM HERD, MANILA.

TRANSFER FROM BUREAU OF SCIENCE.

The herd of cattle, equipment, and premises used by the bureau of science in the manufacture of antirinderpest serum were transferred to the bureau of agriculture on January 1, 1907. It was also provided in the transfer that this bureau should furnish the bureau of science all calves and large animals required in the manufacture of vaccine for the bureau of health, for testing antirinderpest serum, and for other scientific purposes. Under this arrangement the bureau of agriculture became responsible for the management of the serum herd and all processes required in the manufacture of the antirinderpest serum up to the time it is poured off from the blood clot. It is then delivered to the bureau of science for final preparation and cold storage until required in the provinces.

CONDITION OF HERD WHEN TRANSFERRED.

At the time of the transfer the herd contained only 62 serum bullocks with about half of them producing serum. Most of the others required nearly two months to bring them up to the desired condition for bleeding. This made the amount of serum produced in January and February very small. During the six months 97 serum bullocks were purchased, and of these 7 died, the principal cause of death being the development of rinderpest about the time of purchase. Some bullocks have proved to be immune on arrival and given excellent results, but the ideal serum bullock is one that is neither immune nor infected when brought into the serum herd. Three very large Australian bullocks were in the herd at the time of transfer, and while they were carried through to completion they never gave good results. They were wild, very hard to handle, and for some unknown reason their blood always gave poor separation. Chinese bullocks cost less, are easier to immunize, are gentle to handle, and give more serum in proportion to cost than did these Australian bullocks. An effort was also made to use bullocks from the Batanes Islands, where rinderpest has never prevailed. The cattle there show a marked strain of the Spanish "fighting-bull" type, are large and handsome, but very wild. Five were purchased, but on attempting to inoculate them developed a virulent form of rinderpest, and it appeared that all of them were going to die. One was used as a virulent blood animal, two died from rinderpest, and the remaining two were left in such a weakened condition as to be almost useless for the production of serum.

The general condition of the herd has been excellent, probably due in part to the fact that a small amount of green forage has been fed constantly. It is a matter of regret that the herd could not be moved to the new farm at Alabang before the close of the year, where it is certain that great economy in maintenance will result.

PRODUCTION OF SERUM.

The total amount of serum produced during the six months ended June 30, 1907, was 534,500 cubic centimeters. The average number of cattle on hand

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each day during this period was 94. The total number of cattle purchased was 174, the average purchase cost of each animal being ₱77.22.

The total cost of forage for the six months was ₱8,960.14, or an average of ₱0.529 per animal per day. The daily ration was 6 pounds of crushed food and 8 pounds of hay. In addition to this ration a small amount of green forage, probably not averaging more than 2 or 3 pounds per day for each animal, has been supplied from the Singalong experiment station. This would have the effect of reducing the cost of each ration 3½ to 4 centavos.

The amount paid for salaries and wages during this period was ₱5,744.76, making the total cost of serum production ₱14,704.90, and the approximate cost of serum 2.75 centavos per cubic centimeter.

INOCULATION OF CALVES.

It is a common belief of cattle dealers that calves suffer much worse from rinderpest than mature cattle. That this belief is well founded is one of the interesting facts developed during the year.

The director of this bureau undertook a series of experiments during the fiscal year ended June 30, 1906, to prove the reverse—that is, to show that rinderpest is similar to Texas fever in that calves will acquire immunity much more readily than mature cattle. For some reason all of the calves imported by the dealers for the first two or three months after the transfer of this work were very young. They often developed rinderpest in twenty-four hours after arrival, and despite all efforts the death rate ran high. We then demanded older animals. They were furnished, but many of them proved to be from 18 months to 2 years of age and pregnant. The latter almost invariably aborted on developing rinderpest and many of them died. After many discouragements one dealer imported a lot of 16 particularly fine calves which he desired to have inoculated for his private herd. He was finally prevailed on to sell them to this bureau. It was a matter of great surprise to find that after being inoculated for rinderpest they developed Texas-fever symptoms, and 13 of the lot died. It seems evident that they had not been exposed to ticks in China and were not immune to Texas fever.

At another time a lot of calves purchased developed foot-and-mouth disease simultaneously with rinderpest, which caused a few deaths.

One lot of 10 half Shorthorn calves raised at La Trinidad Stock farm, Baguio, was inoculated without a single death. If this is an indication of what can be done with native-raised calves having a strain of improved blood, it may yet prove economical to raise all of the calves required in the manufacture of vaccine.

The total number of calves purchased during the six months was 130, of which 42 died. However, in the face of this severe loss the immune heifers are considered so valuable that one cattle dealer has agreed to furnish all calves required in the manufacture of vaccine, and will stand all losses by death, provided he shall not be required to pay for feeding them while in charge of the government, and that all living calves shall be returned to him after being used for the production of vaccine. His offer will be accepted for a limited time to try the system.

INOCULATION OF BULLOCKS FOR PRIVATE PARTIES.

There has been considerable demand from private parties for the inoculation of cattle for work and breeding purposes. In many cases these requests have assumed the form of urgent demands to accept cattle for treatment when affected with rinderpest.

On account of lack of shed and stall room only the following were taken:

Owner.	Received.	Condition.	Died.	Immunized.
Roxas	54	Bullocks, all infected and exposed	2	52
Verstockt	24	Bullocks, healthy	2	22
Olegario	5	Carabao, 1 infected, 4 healthy	1	4
Flameño	6	Carabao, advanced stages rinderpest	4	2
Lichauco	2	do		2
Miller	1	Bullock, healthy		1
Flameño	3	do		3
Do	1	Australian heifer, advanced stages rinderpest	1	

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CONDITIONS AT CLOSE OF YEAR.

At the close of the year the serum herd contains 107 bullocks, and is producing serum at almost double the average rate of the past six months. We have not been able, however, to meet the demand for serum and shall be compelled to further increase the herd. It will also be necessary to make temporary repairs on the sheds, walks, and corrals, which have recently not been put in good condition pending the removal of the serum herd to Alabang. This removal will now be delayed at least half the year on account of the rainy season.

ALABANG STOCK FARM.

LOCATION.

The Alabang stock farm is situated on the Muntinlupa friar estate, about 22 kilometers south of Manila, on the west shore of Laguna de Bay. This location was selected after more than a year's search as the most suitable place available for a stock farm in the vicinity of Manila. The government dairy is now established at this farm, and the serum laboratory will be transferred there when the necessary buildings shall have been erected. The farm, which was established on December 30, 1906, by the shipment there of a herd of 92 cattle, contains 240 hectares, all of which is available either for cultivation or pasture. As there were no buildings at that time, a temporary camp was established.

Alabang is at present reached by lake steamer calling at Muntinlupa, which is 2½ miles from the farm, and from which the bureau operates a small sailboat. The Batangas line of the Manila and Dagupan Railway has been graded just in front of the farm, and it is understood that this line will be in operation in a very short time. If there is established a favorable schedule on this railroad, Alabang can easily be reached by train in less than one hour from Manila. This will in many respects greatly facilitate the work of this farm, especially in the shipment of milk. We are now able to make but one delivery of milk each day, and the transportation of this milk from the farm to the civil hospital in Manila requires over five hours.

SOIL.

The Alabang farm lies immediately back of the level rice lands which border the lake shore. It contains a small amount of rice land, but the greater part of its area is undulating and hilly, with outcroppings of rock and coarse gravel on top of the hills. The surface soil is underlaid by a heavy stratum of soft, shaley rock, locally called adobe stone. In general, however, the soil is of good depth, fine texture, gray to black in color, and was no doubt formed by the action of Taal Volcano.

WATER SUPPLY.

One local stream runs diagonally across the farm for a distance of more than 2 kilometers and furnishes a fair supply of water throughout the year. Small rivers on the north and south sides of the farm form part of the boundaries. The mouth of the largest river assumes the form of a deep estero, in which the water level of the lake is maintained to within a very short distance of the farm. Should it prove necessary, it is entirely practicable to pump the water from this deep portion of the river to the hills a little farther back, from which it could be easily distributed to irrigate all of the lower lands. A very good site for a small storage dam 12 meters above the lake level has been found. The present water supply is of a temporary nature, consisting of a boiler and a steam pump, used to fill a small tank from the river in the center of the farm. It is contemplated that when permanent buildings are erected an artesian well will be bored near the center of the group, from which water may be pumped for the regular supply.

BUILDINGS.

There were no buildings on the farm at the time it was established, but a few grass sheds were soon erected. Since that time 5 temporary wooden buildings and a bridge across the main river have been constructed, and a contract will be let at once for the construction of a dairy barn with a capacity for holding 50 milk cows. Plans and specifications have already been prepared

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for a serum laboratory, sheds for 150 serum bullocks, quarantine station, superintendent's house, building for the Maltese milk goats, implement shed, and quarters for laborers. All of these buildings will be constructed beginning at the close of the present rainy season.

LIVE STOCK.

The herd sent to this farm six months ago consisted of 92 head of cattle, mostly young stock, and 5 Berkshire sows. Since then 5 cows and calves, 30 head of Chinese cattle, about 20 head of horses, 26 head of Maltese milk goats, 2 Australian Berkshire boars, and 3 sows have been added to the herd, so that now it is assuming the appearance of a stock farm. Among the stock sent to this farm were a lot of Australian heifers received from Townville last September. These heifers were inoculated against rinderpest, with a loss of 5 at that time, and after having been sent to Alabang 9 more have died of various causes. There has been no exception to the rule that imported European and American cattle having rinderpest suffer severe emaciation and make practically no growth within a year after taking the disease.

INTRODUCTION OF MALTESE GOATS.

The bureau of agriculture sent a representative to the island of Malta in October, 1906, for the purpose of purchasing and shipping to Manila 20 Maltese milk goats. It was known at the time that these goats were the carriers of the infection of Malta fever, and instructions were given to have all animals purchased thoroughly examined, and certified free from the infection of this fever before shipment. This necessitated the inspection of several hundred head, the employment of experts, and the use of microscopic and laboratory methods for the determination of the presence or absence of the disease. The work was beset with many difficulties on account of the ignorance and superstition of the natives of Malta, and it is highly probable that we could never have obtained these goats but for the good offices of the American consul stationed at Valletta. They were finally secured, placed in quarantine, and later shipped by the Peninsular and Oriental steamship *Palmero* by way of Hongkong, with a native Maltese goatherd in charge. They fared quite well on the voyage, only 1 death occurring. Another animal, however, was injured so that she died soon after arrival in Manila. Several kids were born en route and the animals have bred freely ever since their arrival. Five of the goats died after being sent to Alabang, apparently from eating a poisonous vine growing on that farm. At the end of six months, however, the original herd of 4 males and 14 females arriving in good condition in Manila now makes a total of 28 head. They have apparently done well at all times and give every promise of success. While it is known that some of the goats of this herd will give from 5 to 8 pints of milk per day, this much has never been taken, as it is desired to give the kids a liberal supply to insure their rapid growth and maximum development. They are much larger than the common goats, of thin conformation, and have a heavy coat of long hair with light brown or liver color and white predominating. It is thought that they will be particularly valuable as milk-producing animals in the Philippines, on account of the high price of dairy cattle, the severe losses sustained among such cattle, when imported, and the lack of knowledge among the people concerning the dairy business.

CONDITION OF STOCK.

All of the stock on this farm has kept in excellent condition, although taken there in the dry season and fed only a small amount of grain. The wide strip of land uncovered by the going down of the lake in the dry season has been covered with a good growth of Bermuda and other grasses, and has furnished excellent pasturage. The Chinese cattle have not been given any dry feed at all and have done particularly well.

There are now on this farm 14 calves, from a few weeks old to six months. They are uquestionably in the best condition of any calves ever raised by this bureau. The horses so far sent to this farm have been, with a few exceptions, the culls and condemned stock from other farms. If these horses do well at Alabang, it is contemplated that more will be sent there during the coming year. The hogs have been kept in a corral, where they have plenty of room to exercise, and have done exceptionally well at all times.

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IMPROVEMENTS.

About 6 hectares of land have been brought into cultivation and planted in such forage crops as corn, sorghum, and guinea grass. The permanent improvements contemplated on this farm will be undertaken as soon as the appropriation act has been passed, and will include not only the erection of buildings, but also the clearing of land, building of roads, fencing of the entire farm, and other necessary improvements incident to its operation as a first-class stock farm.

TRINIDAD STOCK FARM.

LOCATION.

This new farm was opened during the closing months of the last fiscal year. It is located in what is locally known as the Little Trinidad Valley, which opens out into the large Trinidad Valley about 6 kilometers north of Baguio.

SOIL.

The small valley contains about 16 hectares of fairly level land, which for the most part consists of a stiff, red clay soil. It has all been under cultivation at one time or another by the Igorots, who used it especially for growing sweet potatoes. The hill land immediately surrounding this valley consists of clay mixed with a great quantity of broken stone of all conceivable sizes, is very rugged, and only accessible by following around the hills in certain directions. The land under the control of this farm is all quite broken, being frequently cut by deep canyons, and is estimated to contain about 400 hectares.

WATER SUPPLY.

The water supply at the buildings comes from a small spring, the water of which is conducted down to the barns through a 1-inch pipe. In the heart of the dry season it barely furnishes enough water for all of the stock on the farm. About a kilometer distant from the buildings, across a rugged backbone of the hills, is a small river in the bottom of a canyon. This river can not be reached at a point immediately opposite the farm by the live stock, but a trail has been graded up the stream to a point where the animals can readily gain access to it. Should the water supply in the small valley fail, it will be necessary to put in either a hydraulic ram or pump in this river and carry the water over the top of the intervening ridge to the barns.

IMPROVEMENTS.

The grazing lands are so mountainous and rough in nature as to necessitate considerable work in the building, widening, and opening of trails and roads in order to afford the stock access to the different parts of the range. Other work on the range consisted in fencing along precipices, the filling up of deep and dangerous holes, the building of five grass sheds for the protection of stock during severe storms, the completion of 2½ miles of wire fencing bordering on one section of the pasture, and of fencing to subdivide the grazing lands in order to protect the range.

The improvements around the main quarters have consisted in the construction of a stallion and breeding corrals, paddocks for brood mares and colts, and a grass wagon shed; in laying a pipe line which supplies the stabled stock with spring water, plowing of new lands, leveling of mud fences which were of no practical value to the farm, improving the main wagon road by giving it a top dressing of broken stone, and digging ditches to drain the meadow land.

Considerable labor has been performed on the stallions to keep them in proper condition for breeding. This required daily exercise under the saddle and the most careful and thorough grooming.

The condition of the brood mares and burros was rather poor at the beginning of the fiscal year, on account of the poor range where they had been kept, and a great deal of time was required to get them back into good breeding condition.

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PASTURES.

While the grazing lands controlled by the stock farm comprise about 400 hectares, fully 25 per cent of this is worthless on account of its being inaccessible to large animals, and the remaining portion is a poor class of pasture land. The range is subdivided into several sections and the cattle have been kept in fair condition by moving them from field to field. During the dry season, when the mountain pasture was exhausted, the cattle were removed to the Trinidad Valley, which is public grazing land. The principal grass in this section is a species of wild rye and grows very slowly, even during the rainy season. After being grazed during the dry months, the grass on the exposed range dries up and is almost worthless as a forage. Investigations last March showed many places on the range to be as clean as if swept by fire. Only in the canyons and gulches can any good grass be found during the dry season, and these places are often dangerous to stock on account of the pitfalls, underbrush, and deep holes. The loss by death of cattle grazing in the canyons last year was very large. The superintendent of the farm estimates that to subsist one cow and calf per year on this range requires about 6 hectares of grazing land. The present size of the herd has taxed the pasture to its full capacity the past year. There is but a small area of grazing land on which imported horses, and mares with colts, can graze with any degree of safety.

STOCK ON HAND.

Stallions, imported, 2; mares, imported, 14; mares, native, 20; colts, yearling male, 1; colts, yearling fillies, 4; colts, suckling, American, 4; colts, suckling, grade, 5; burros, jacks, 6, jennets, 11; bulls, imported, 3, grade, 3; cows, imported, 1, native, 47; steers, grade, 6; calves heifers, grade, 23; bullocks, 17; boars, Berkshire, 1, grade, 2; sows, grade, 1; goats, 4; sheep, 8; making a grand total of 185 domestic animals at the farm.

INCREASE BY BIRTHS.

The increase by births for the past year was as follows: Colts, American bred, 5; colts, grade, 7; calves, grade, 13; steers, grade, 6; sheep, 2; goats, 1.

BREEDING.

The Arabian "Beder" and the Morgan "Duke of Albany" are the two stallions at the head of the stud. Both horses have been in excellent condition to perform the duties required of them. It has been found difficult to induce the Igorots to avail themselves of the opportunity of breeding their mares to these horses, and only by great persuasion were three native Igorot owners of mares induced to breed to "Beder." The result of the breeding performed this year is as follows: "Beder" served 4 imported and 8 native mares, property of the bureau of agriculture, 1 American mare belonging to the army, and 5 other native mares—a total of 17. "Duke of Albany" served 14 American mares, property of the bureau of agriculture, and 8 American mares belonging to the army—a total of 19. The Galloway bull served 15 cows belonging to private parties, besides running regularly on the range with the government cattle. The Devon bull was bred to 5 cows belonging to the bureau of agriculture. The Berkshire boar served about 30 outside sows and the grade boar about 25.

One grade Galloway bull, 2 years old, is doing service at Mr. Lewis's stock farm near San Fernando, La Union, and one grade Galloway bull, 2 years old, is doing service at a small stock farm in Lepanto-Bontoc. One Australian bull is doing service on another stock farm at Bua, Benguet. The breeding season of the horses commenced on November 1, 1906, and ended July 31, 1907. This period was selected because the mares would have their colts between October 3 and July 2, thereby avoiding foaling during the severe rainstorms which annually visit this section of the country during the months of July to October, inclusive, and the stallions needed a rest of a few months each year to recuperate after a vigorous season of stud service. The cattle, sheep, goats, and hogs have been allowed to breed the entire year. It is the intention during the ensuing year to separate the bulls from the cows as has been done with the stallions.

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CARING FOR STOCK.

The past year's experiences in handling equines has demonstrated that, to successfully raise them here, they should have daily care and attention and should not be required to rustle for themselves. During the rainy season they should have access to proper shelter. The care required consists in a liberal daily ration of hay and grain, stabling and grooming. The imported horses and cattle have not done well on the range. At times during the rainy season (clear weather) they will do a little foraging, but if left to subsist themselves they rapidly fall off in flesh. The native-bred horses and cattle are much better rustlers than the imported stock, and by keeping as close to their natural habits as possible without putting them to severe hardships they will thrive fairly well.

WOOD TICKS.

The ticks have been a great source of annoyance to the horses and cattle, particularly during the dry season. The calves and colts have had to be bathed with dip on an average of every six weeks, and yet ticks could be found on them at all times of the year.

CLIMATE—HEALTH.

The climate in this vicinity is temperate, mild, and cool for the greater part of the year. During the rainy season the rains are copious and frequent. The climate seems to agree with the health of all domestic animals on the farm and during the past year the stock has continued to be free from malignant, contagious, or infectious diseases.

MORTALITY—LOSS.

The death records of stock show that 5 cows died from accidents received in pasture, 1 American suckling colt from diarrhea, 1 suckling burro colt from acute peritonitis, 4 adult burros from accidents received in pasture, 2 bullocks from old age, 1 young steer from debility, 1 native mare during period of parturition, 1 colt from accident in pasture, 1 lamb was killed by a dog, 1 pig was drowned, 2 cows could not be accounted for (probably stolen), and 1 carabao was stolen.

FORAGE CROPS.

Experiments in the raising of forage crops have been very limited. The most successful forage plants so far developed are oats and Bermuda grass. Oats sown on well-manured land produced a healthy, quick, luxuriant growth, but failed to produce seed on maturity, the heads of the plants being empty. The green oats if cut and cured make fair hay. Bermuda grass can be found growing in many parts of the Trinidad Valley, and when transplanted does exceedingly well. It has a tendency to grow during the dry season when other grasses are apparently dead. Guinea grass, raised from transplanted roots sent here from Manila and set out in well-manured rich soil, has done remarkably well, and may be a valuable forage plant for this section of the country. The seed of the Guinea grass was planted in several places under several different conditions but failed to germinate. Volunteer clover when transplanted grows very well in the rainy season, but perished during the dry months. By irrigation, however, clover may be successfully raised.

IMPROVEMENTS CONTEMPLATED.

During the coming year it is planned to erect a separate building to contain sufficient stalls for all the stallions kept at this farm. It has proved quite an unsatisfactory arrangement to keep them in the same barns with the mares and colts. The main hill range lying west of the buildings will have to be fenced to protect it against the invasions of outside stock. It is also planned to fence in a portion of the main Trinidad Valley, now used as public grazing land, and to utilize it both for the grazing of the government stock during the dry season and as a breeding station for horses and cattle from the surrounding country. Grasses and clover will be put out on the level lands surrounding the buildings and small plats of Bermuda and Guinea grasses will be set out

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all over the range, to be used in future as a source of supply for the further extension of these grasses. Experiments will also be made on these ranges with imported clovers and grasses, such as lespedeza and orchard grass.

RECOMMENDATIONS.

The following recommendations are respectfully submitted with a view to bettering the services rendered by this bureau:

1. That the provincial force of employees be increased by the addition of 1 special agent or superintendent of extension work, whose special duty it shall be to advise the people in the provinces of the work done by this bureau and secure their cooperation; 5 veterinarians, desired on account of the increased work in the control of infective animal diseases; 3 agricultural inspectors, and 9 assistant agricultural inspectors with the same qualifications as inspectors. These inspectors and assistant inspectors are desired as general agents of the bureau in the provinces to supervise the crop-reporting service and to investigate all questions relating to agriculture and animal industry.
2. That there be passed a general veterinary sanitary law[a] for the Philippine Islands, under the provisions of which the bureau of agriculture can control the movements of live stock and thereby prevent the further introduction of infectious animal diseases.
3. That stock yards with suitable isolation, and with a sufficient capacity to hold all animals imported into these islands or otherwise brought into or through these ports, be established in the cities of Manila, Iloilo, and Cebu. These stock yards are designed to be used also as quarantine and innoculation stations during the time necessary for the eradication of the fatal infectious animal diseases now existing in the islands. Nothing short of absolute eradication of these diseases will ever restore complete prosperity, and it is recommended that whatever action be taken this object be kept in view.
4. That small inoculation stations be established at Batangas, Province of Batangas; either Bacolod or Silay, in the Province of Occidental Negros; and Legaspi, in the Province of Albay; to be used as quarantine and inoculation stations so long as the necessity for them may exist.
5. That suitable sites be selected and experiment stations established for work with the standard crops of the islands—such as abaca, cocoanuts, tobacco, and rice. None of the farms at present operated by this bureau are located so as to be adapted to all of these crops which furnish our principal commercial products. If one satisfactory site could be found on which all of them would grow well, it would be just that much better.
6. That small temporary stations be established at Sablan and Naguilian on the trail from Baguio to San Fernando, Union, and operated in connection with the Trinidad farm, with a view to testing the growth of different crops at varying altitudes.
7. That the present sugar farm in Occidental Negros be converted into a general experiment station, with a view to working with crops particularly adapted to the Visayan Islands. It is probable that the proposed experimental work with sugar cane, abaca, rice, and cocoanuts can be carried on at this farm, which is also suited to work in animal industry, especially with cattle and hogs.

G. E. NESOM,
Acting Director of Agriculture.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

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[a] On Octobr 10, 1907, act No. 1760, "An act to prevent the introduction into the Philippine Islands of dangerous communicable animal diseases, to prevent the spread of such diseases within the islands, and for other purposes," was enacted by the Philippine Commission.

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APPENDIX G.

REPORT OF THE DIRECTOR OF THE WEATHER BUREAU.

DEPARTMENT OF THE INTERIOR, WEATHER BUREAU,
Manila Observatory, July 31, 1907.

SIR: In this report for the year ended June 30, 1907, I shall follow, in general, the outlines of previous annual reports, viz: I. Manila central observatory and its departments. II. Secondary stations. III. Personnel. IV. Expenses of the weather bureau. V. Difficulties and plans.

I. MANILA CENTRAL OBSERVATORY.

DEPARTMENTS OF THE CENTRAL OBSERVATORY.

(*a*) *The meteorological department.*—(1) One observer, at least, is on duty from 6 a. m. to 7 p. m., Sundays and holidays included. This arrangement, since it was put into practice two years ago, has worked so satisfactorily that it will be continued. As a complement to this, a minor employee has been secured, in addition to the official force, to be ready during the night to answer any calls by telephone and to give notice to some of the staff should anything important happen. Besides, as the main door at the observatory is closed, as a general rule, at about 8 p. m., an electric bell has been connected with the door for the convenience of those who after that time may need to see the director or any one of the staff or to deliver any urgent telegram. Whenever the weather is threatening some of the observers are on duty, even during the night, according to the importance of the work to be performed.

(2) It has been found by long experience that the telegraph operator has to be on duty longer than the office hours, but owing to his liberal salary, which would be enough to maintain two operators, he is willing to secure an assistant without extra cost to the government.

(3) A source of no small work, especially for the staff, is the many calls by telephone day and night from persons requiring information whenever the weather becomes complicated or some storm signal is hoisted in Manila. In connection with this I may add that sometimes these calls prove a nuisance, especially during the night, owing to the perfectly irrelevant questions asked. To avoid this inconvenience, a short bulletin is telephoned to the central office about weather conditions for the benefit of all callers, with the request that the observatory be called only in extraordinary cases.

(4) It is the intention of the staff to select and improve any practical means tending to spread rapidly the warnings of the observatory through the city whenever the weather is threatening; and to this end there has been some correspondence between the director and the secretary of the interior, with the result that at the request of the secretary of the interior the municipal board was directed by the acting secretary of finance and justice, the Hon. Henry C. Ide, on July 9, 1906, to issue the necessary instructions to the police department to give warning to the inhabitants of the city whenever the department is notified by the weather bureau of the approach of a typhoon dangerous to the city. On July 18 Mr. P. G. McDonnell, member of the municipal board, sent a copy of the committee report, which was approved by that board in its session of the morning of the same day, on the cooperation of the police department in spreading among the people of Manila the warnings of the weather bureau when requested by the observatory, together with the information that arrangements were made for connecting the observatory and the police headquarters by a direct wire, which fortunately passes the corner of the city hall, making the expense very insignificant. Every policeman on duty reports over the police-

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alarm system to his station once each hour. In this way it will be possible to communicate the news of the approach of a dangerous typhoon to every beat in the city within the space of not more than one hour and a half from the time it is received from the observatory, and the policemen in turn will promptly spread the information to all of the residences on the various beats. It is believed that this method will be entirely satisfactory and will confer a considerable benefit, as it was practically tested in September, 1906.

(5) Another arrangement has contributed to spread rapidly the news of coming typhoons, even throughout the islands, namely, the transfer of telegraphic business to the bureau of posts, so that it shall receive and transmit weather notes to and from Manila as a function of that bureau. This arrangement was first put in operation January 1, 1907, but owing to the fact that no other bureau is allowed to receive and transmit telegrams through the bureau of posts, it has been considered advisable by the Commission to restore the old law of the payment for telegrams, thus putting our bureau on the same footing as all other insular bureaus in that regard.

Beside the ordinary daily dispatches to China, Formosa, and Japan, 28 special typhoon warnings were issued to foreign centers during the year, each of them having been forwarded to Haiphong, Hongkong, Shanghai, Taihoku, and Tokio.

In the meteorological department instruments are compared and certificates of comparison issued gratis. The number of barometers observed, and when necessary cleaned and corrected, was 205.

(*b*) *The astronomical department.*—(1) Rev. Father Juan Comellas, the astronomer, was appointed assistant director in November, 1906. He is entirely competent to look after this department. Almost four months were taken for the improvement of time service. The transit instrument has been cleaned and readjusted and one of the chronographs with a sidereal time clock transferred to the meridian transit room.

(2) The adjustment of the magnificent Riefler mean-time clock up to the present has been unsuccessful, owing partly to the effect of perceptible earthquakes, partly to the difficulty in the perfect exclusion of the air from the glass box of the clock, and finally to the inconstancy of the electric-battery currents for self-winding.

(3) The standard sidereal clock has been provided by our mechanics with electric contacts and has been connected with the chronograph for the observations of star transits.

(4) After each sensible earthquake the wires of the meridian-transit-instrument-reticule are to be remeasured to determine the instrumental constants.

(5) An exact readjustment of the equatorial has commenced and has taken several weeks, without being perfected as yet. The pier of the instrument had to be modified for the adjustment in azimuth at a cost of ₱414. The mechanical device for opening the shutter of the dome was found deficient since its construction and had to be improved at no small cost.

(6) The number of the chronometers compared and rated was 15, 14 less than in the past fiscal year. This decrease may be due possibly to better facilities to observe the time ball from the new port, or to the fact being more widely known that there is telegraphic transmission of time by wire to the most important ports and telegraphic stations of the islands.

(*c*) *The seismic department.*—(1) During the period covered by this report, 126 earthquakes were reported from the islands. In Manila only 10 local earthquakes have been experienced, all of them of very moderate intensity, except the one on April 19, which was strong here and violent and destructive in Camarines. Of the 126 shocks felt in the archipelago two were violent, one in Camarines Province on April 19 and another in Ilocos Norte on May 25.

(2) Special mention is to be made of different periods of shocks more or less protracted and very frequently without any of them being violent. In northern Luzon a series of shocks occurred from the afternoon of the 17th to the midday of the 18th of October. In the northeast region of Mindanao from the 20th to the 23d of December more than 12 perceptible shocks were felt, but no one strong. In Romblon and adjacent islands from the evening of the 23d to the early morning of the 24th of January various shocks of slight intensity were experienced. In Masbate small tremors occurred on the 3d and 4th of April. In Camarines after the violent earthquakes of the 19th of April a series of aftershocks occurred almost every day up to May 12, the frequency being very extraordinary on the 20th, 22d, 26th, 29th, and 30th of April. In the extreme north of Luzon many light shocks occurred on the 4th of May. A set of small shocks were felt on the eastern coast of Samar on May 16,

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and in the northeast of Mindanao and south of Leyte on the 17th, 19th, and 20th of the same month.

(3) The violent earthquakes of Camarines on April 19 have been registered in all the seismic stations in Europe and we suppose in those of America. Other earthquakes of less intensity were recorded in many seismic stations, as, for instance, that of October 17 in northern Luzon, of July 11 in the eastern coast of Mindanao, of October 16 in the same region, and of May 25 in northern Luzon. It may be ascertained that those earthquakes which without being violent in the islands were registered in Europe and in America had their epicenter in the Pacific not far from the archipelago, where, according to the very recent observations and soundings of the German steamer *Planet*, lies the greatest sea depth ever found up to the present time.

(4) At the end of the year 1906 two horizontal pendulums (Bosch-Omori type) made by our mechanics were installed, which since that time have given very excellent records of distant earthquakes, and in that respect the instrument has resulted better than the Vicentini microseismograph, which being more universal is unsurpassed to register both local and distant earthquakes. The records obtained with these instruments may be classified as follows: Records of earthquakes whose epicenter was located in the archipelago or not far from it, 200, and those of distant earthquakes, 40. Among them the most remarkable were that of Valparaiso on August 16, that of Sumatra on January 4, and that of Mexico about the middle of April.

(5) The record of the Valparaiso earthquake is by far the most interesting. It was published in our bulletin for August, 1906, and it is highly gratifying to know how welcome this seismogram has been to scientists. *Nature*, a weekly illustrated journal of science, No. 1956, volume 75, for April 25, 1907, page 613, says: "The bulletin of the Manila weather bureau for August, 1906, contains a reproduction of what is probably the only complete seismogram of the Valparaiso earthquake in existence. The distance from the centers of the North Pacific and Chilean earthquakes of August 17 was such that the disturbance due to the former had practically died before the arrival of the latter. The first preliminary tremors commenced at 1 hour 1.3 minutes, Greenwich time, and lasted until about 1-21. The instrument being a Vicentini microseismograph, with a vertical pendulum of 1.5 meters length, the third-phase waves, which give the greatest amplitude with a slow period horizontal pendulum, are of small size, and it is largely due to this that the earlier phases of the record of the Valparaiso shock are so little complicated by the end portion of the preceding one."

A copy of this seismogram, at the request of the consul for Chile in Manila, was sent to the secretary of foreign affairs of Chile, and the original has been requested by cablegram by the international committee of seismology, to be inserted in its report and presented to the International Congress of Seismologists to be held in Rome next September.

(6) On January 4 our Vicentini seismograph registered two distant earthquakes in such a way that while the slow waves of the first were recorded the first preliminary tremors of the second began to be marked. Neither the seismograms of Europe nor those of Shanghai show more than a single record corresponding to a shock in Sumatra, the second one, corresponding to our records, not being located as yet. This fact makes us suspect that the epicenter of the second earthquake lies in the western Pacific some 5,000 kilometers from Manila.

(7) From all the above facts we may conclude that during the fiscal year 1907 great seismic activity has been developed in the western portion of the Pacific where the archipelago lies, as well as in the eastern Pacific along the western American coasts. Among the 126 earthquakes reported in the archipelago 6 may be termed great earthquakes, as their waves reached Europe and America, although fortunately none of these caused such a destruction of lives and property as those of the eastern Pacific.

(d) *Magnetic department.*—This department has remained as stated in last year's report. Little hope is now entertained of erecting this department in Baguio, on Mirador Mountain, even in the supposition that a steam railway will be constructed from camp No. 1, as the probability of an electric line to Trinidad or to Cervantes from Baguio would surely destroy the installation within a few years.

(e) *The mechanic's shop.*—The most important work has been the construction of the horizontal pendulums, which were put into operation at the end of the year 1906. There has been also a slight decrease in the amount of repairs

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requested by other bureaus, owing probably to the betterment of equipment of tools, both in the bureau of science and in the navy-yard. It would be well to detach from time to time one of the mechanics and send him on a tour of inspection of the instruments in different stations.

Crop service.—In our last report we stated, in reference to this service: "No action has been taken by the authorities relative to the plan of a more extended crop service, proposed in last year's report. Nor do I believe that under the conditions prevailing at present anything can be done to improve this service, highly deficient though it be." It has always been difficult to awake interest in it. Finally, according to a statement in a pamphlet from the bureau of agriculture, that bureau will undertake this service as one of its functions, and there is hope that to avoid duplication the weather bureau will be relieved of this duty and be able to devote all its energies to more proper investigations.[a]

IV. EXPENSES OF THE WEATHER BUREAU.

I beg to submit a summary of the expenses of the weather bureau during the fiscal year to June 30, 1907. I shall add, also, for your information, the auditor's account:

Weather bureau—Summary of the fiscal year July 1, 1906, to June 30, 1907.

FUNDS AVAILABLE.

Retained balance, fiscal year 1906	₱1,703.07
Appropriation for the fiscal year 1907, act No. 1527	114,500.00
Interbureau voucher deposited	64.40
Total	116,267.47

EXPENDED.

Salaries and wages	₱68,618.99
Printing and binding [b]	17,169.64
Telegrams and cablegrams, including ₱6,000 transferred to bureau of posts	13,217.45
Postage on correspondence and publications	2,862.54
Transportation of persons and freight, per diem	951.14
Rent of offices and instruments	9,000.00
Miscellaneous expenses	738.98
Total	112,558.74

The total expenditure of ₱112,558.74 includes the following liabilities, taken over from the fiscal year 1906:

Salaries and wages	₱70.00
Printing and binding delivered during June, 1906	561.15
Collect messages received during June, 1906	774.54
Total	1,405.69

LIABILITIES, FISCAL YEAR 1907.

Bureau of supply, bill for instruments, about	₱1,590.85
Miscellaneous small accounts, aggregating about	250.00
Total	1,840.85
Total of funds available	116,267.47
Total of payments made	112,558.74
Unexpended balance	3,708.73

[a] Data in regard to the following have been omitted and are on file in the Bureau of Insular Affairs, War Department: Improvements of the central observatory, publications, secondary stations, and personnel.

[b] The cost of printing and binding was in reality ₱17,222.80. The item given includes a credit in favor of the weather bureau resulting from the sale of documents.

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Adding to the payments actually made the difference by which the liabilities arising during the fiscal year 1907 exceed those taken over from the preceding year, ₱435.16, we find that the expenses incurred are well within the appropriation, being ₱113,013.90.

AUDITOR'S ACCOUNT.

CREDIT OF APPROPRIATION.

Retained balance, fiscal year 1906	₱829.32
Appropriation for fiscal year 1907, act No. 1527	114,500.00
Interbureau voucher deposited	64.40
Deposited by insular disbursing officer	5,500.00
Total	120,893.72

DEBIT TO APPROPRIATION.

Drawn in favor of disbursing officer	98,380.00
Transferred to bureau of posts	6,000.00
Paid to bureau of supply (before I.-B. voucher)	543.30
Settlements of interbureau vouchers	13,337.69
Total	118,260.99
Total credits	120,893.72
Total debits	118,260.99
Treasury balance	2,632.73

INSULAR DISBURSING OFFICER'S ACCOUNT.

DEBITS.

To balance of fiscal year 1906	₱873.75
To accountable warrants in his favor	98,380.00
To refund to appropriation	65.85
Total	99,319.60

CREDITS.

By expenses of the weather bureau	92,743.60
By refund to treasury	5,500.00
Total	98,243.60
Total debits	99,319.60
Total credits	98,243.60
Balance	1,076.00

V. DIFFICULTIES AND PLANS.

(a) *Daily weather chart.*—The data compiled daily in the central office are such that the time has come to elaborate a weather map, giving the weather conditions in the islands and in the whole Far East every day for 6 a. m. This map is ready about noon each day, and it is the intention of the staff to have prepared a small number of copies every day for the general benefit of all concerned.

Up to the present time we have been confined to having the map drawn on a board in the office and filed in special blanks. This work of making up the weather map may be considered the most practical and the most important work of the office. It requires the cooperation of the best part of the force of employees and the greatest care in the transmission of the home and foreign telegrams. To secure the latter a correspondence with the superintendent of the Australasia and Eastern Extension Telegraph Company in Manila, and through him with the general manager of this company for the Continent, has proved very successful, as at present, through the kindness of this company, at

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about 11 a. m. every day, cablegrams, free of any charge, corresponding to the morning, from Japan, Liukiu Group, Formosa, and the China coast, are in the office to help in drawing the weather chart and making out the weather forecast for the next twenty-four hours.

(b) *Difficulty in securing proper employees.*—It has been always difficult to secure good employees for this office and for the stations, as there is no way of securing scientific training in meteorology or seismology in the colleges, schools, or university, and the observatory has to prepare its own observers to pass the civil-service examinations to supply the stations and the office. Fortunately the personnel is so faithful that there is scarcely any change from year to year. See report for the fiscal year 1904–1905, appendix, roster of Manila observatory. But whenever a new instrument is procured, new practice and instructions are required, and from time to time reliable methods are to be renewed by ordering some of the observers to come to the central office for practice. For that purpose a model of a first-class station has been erected on our grounds and is kept in working order for instructing those who are to be examined and to improve the practice of our own observers.

(c) *Monthly summaries of meteorological elements.*—In the belief that a monthly summary of the meteorological elements for Manila would be of interest to the general public, especially if published immediately after the close of the month, the weather bureau will prepare such summary beginning July, 1907. Forms have been printed to be filled at the expiration of each month and distributed to the newspapers for publication.

It is also intended to have another form, which will give the normal or average values of the various meteorological elements for each month, as deduced from many years' observations to be published at the end of the previous month. Thus the public will be informed on the second or third day of each month as to the actual conditions during the previous month, and on the last day of the month of what it may reasonably expect the weather to be during the month to come.

(d) *Publication of old observations.*—By some combination of circumstances observations of a few back years were not printed. The appropriation for printing since 1885, which was rather meager, having been wholly exhausted in printing the meteorological curves, some pamphlets, blanks, other minor items, and the records for the years 1885, 1887, part of 1888, 1890, and all successive years up to the American occupation. Previous to the year 1885, the records for 1884 and part of the year 1875 and 1877 were not printed, on account probably of want of means. The originals are on file, and it has been deemed advisable to now print these observations to complete the records and to cover the requests we have from time to time from other institutions. A contract has been made with a private printer in Manila to have all these observations printed within a few months, the observatory defraying from its private resources all the expenses incurred thereby. All this work will be surely done before the expiration of the next fiscal year, 1908. The expenses will amount to several hundred dollars.

(e) *Synchronization of clocks.*—As the rate of the Riefler's pendulum is not yet satisfactory, an attempt to synchronize our clocks has not yet been made, but it is hoped that the work will be undertaken in the near future.

(f) *Monthly seismic bulletin.*—Records of seismograms are in considerable demand. Provision has been made to have a short seismic bulletin issued every month for exchange with the most important geodynamic observatories of the world, previous to the regular publications of our monthly bulletins, and as an advance sheet of the same. Dr. E. Rudolph, of the International Seismological Committee, has made an application for the original of the most important seismograms, which has been granted reluctantly on condition that they be returned, and only a few were allowed for the purpose of determining the instrumental constants and other features which may be discovered by comparing them with seismograms of other instruments.

(g) *Third-class observers.*—There is no small difficulty in finding able observers for Class III stations, which are the most numerous and the most useful to the bureau. The salary being moderate, men of fair ability will not go to such remote places as Caraga, Davao, Santo Domingo, etc., unless there be some other inducement, which is scarcely ever found. On the other hand, it is very important to secure natives who are willing to stay long periods in these places, otherwise the traveling expenses would not be compensated by the benefit and usefulness of the stations. But the long permanency, without inspection, which

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could not be carried on very successfully, has led to practical difficulties which experience has shown: systematic errors in observing, due to inattention to instructions, negligence in carrying out new instructions, errors due to improper care of the instruments, etc. The only way of avoiding them is to order these observers to come to the central office to renew practice and methods at their own expense as a sort of fine or compensation. This has been done in some instances with success.

(h) *Use of weather code.*—The statements made as to the difficulty in the use of the code for the transmission of the weather note in the last report have been confirmed by experience. Weather conditions are not stereotyped as found in nature; in fact, it has been often found impossible to select a code word which covers the situation. Supplements to the code may diminish the difficulty, but not solve the problem. Hence the transmission of the weather note will be a source of immense expenditure, and, curious enough, this will naturally increase as the benefit increases or as the warnings are more widely spread.

Very respectfully,

JOSÉ ALGUÉ,
Director of Weather Bureau.

To the SECRETARY OF THE INTERIOR,
Manila, P. I.

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REPORT OF SECRETARY OF COMMERCE AND POLICE.

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REPORT OF THE SECRETARY OF COMMERCE AND POLICE.

DEPARTMENT OF COMMERCE AND POLICE,
Manila, November 1, 1907.

GENTLEMEN: I have the honor to make the following report of the operations of the various bureaus of the department of commerce and police for the fiscal year ended June 30, 1907.

COMMERCE.

It has been evident since the beginning of the fiscal year that the commerce of the Philippine Islands has taken a decided turn for the better, and that the tone among the merchants of Manila has been very much more settled and more optimistic. This can not be taken as indicating a condition of real prosperity, but it is a very good sign for the future.

On August 31, 1906, the Commission passed an act abolishing all tonnage dues. The amount which had been collected was not very large, but the fact of the abolition of this tax had a very marked effect on the encouragement of commerce, and many steamers have come to Manila that would otherwise not have done so.

The death of draft animals from the ravages of rinderpest, which breaks out from time to time in one or another of the provinces and sometimes gains considerable headway before the bureau of agriculture is able to reach the scene with its inoculators and stamp it out, still continues to menace the prosperity of some regions, and this, with the bad condition of roads, many of which have been steadily deteriorating owing to lack of funds hitherto available for road maintenance and a consequent failure on the part of the provincial and municipal governments to maintain them, have combined to retard agricultural development in certain regions. On the other hand, this has been compensated by rapid and ready response to improved transportation facilities in other sections, particularly in the valley north of Manila, which might almost be called the "granary of the Philippines," on account of its fertility and the extent of its cultivation.

In my last annual report I gave a résumé of the importations of rice. It is gratifying that this continues to show a steady decrease. It is to be expected that a certain amount of rice will be imported every year, as many prefer the kind of rice that comes from Saigon, particularly Chinamen, who purchase it in preference to the native product.

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Importations of rice since 1899, by fiscal years:

1899	₱3,877,864	1904	₱23,097,628
1900	6,372,396	1905	14,913,476
1901	10,981,916	1906	8,751,000
1902	13,156,962	1907	7,324,986
1903	20,122,646		

(In my last annual report errors in two figures managed to slip in, the report of the importation of rice for 1903 having been placed at ₱30,122,646 when the amount should have read ₱20,122,646, and in the report for 1906 having been placed at ₱8,743,964 when the amount should have read ₱8,751,000. The former was a clerical error and the latter was an error which has been corrected in the report of the collector of customs for the fiscal year 1907. Both have been corrected in the present report.)

For the nine fiscal years since American occupation the figures of imports and exports are as follows:

Year.	Imports.	Exports.	Total.
	Pesos.	*Pesos.*	*Pesos.*
1899	26,233,134	29,280,334	55,513,468
1900	41,202,876	39,642,694	80,845,570
1901	60,552,400	46,445,696	106,998,096
1902	64,058,714	49,089,716	113,148,430
1903	65,956,890	66,300,240	132,257,130
1904	66,442,502	60,452,254	126,894,756
1905	61,758,096	64,711,730	126,469,826
1906	51,597,710	63,836,760	115,434,470
1907	59,332,280	67,543,034	126,875,314

It will be seen that apart from the importation of rice the growth has been steady, healthy, and uniform. As the importations for railroad construction come in free of duty, they have not been included in the figures submitted. The amount of railroad material imported free of duty for the fiscal year 1907 was ₱879,959.

Comparing the year just ended with the year 1904, if we eliminate the decrease in the importation of rice, which amounts to ₱15,772,642, we find an increase in the imports of all other commodities of ₱8,662,420, or 17.095 per cent.

CHANGES IN THE DEPARTMENT.

On December 10, 1906, by virtue of act No. 1568, the bureau of port works was abolished as a separate bureau and included as a division in the bureau of navigation.

Under authority of the Secretary of War, the United States Signal Corps have begun to transfer the lines and cables heretofore operated under the direction and at the expense of the United States Army to the insular government. This transfer was formally completed and approved by the Secretary of War as of date of October 4, 1907.

By virtue of act No. 1507 the office of supervising railway expert was separated from the bureau of public works, where it had been assigned for administrative reasons, and was made a separate office.

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BUREAU OF CONSTABULARY.

COST.

The total cost of the Philippines Constabulary for the year was ₱3,251,436.40, as against ₱3,744,000 for the fiscal year 1906, a decrease of ₱492,536.60. Of the cost of the constabulary for 1907, ₱105,000 was due to the fact that the force for the most part have been rearmed with the Krag-Jörgensen carbine with bayonet, discarded by the United States Army for their new service rifles.

FORCE.

The force at the beginning of the fiscal year 1907 was 4,932 men and 315 officers, and at the end of same was 4,748 men and 305 officers.

CHANGE IN THE CHIEF.

On April 1, 1907, Brig. Gen. Henry T. Allen, who had served as chief of the constabulary, and later as director of constabulary from the organization of the bureau, received orders from Washington to return to his regiment. He had served with distinction as chief of the constabulary since its organization, and to him is due much of the credit for the fine, efficient, and economical organization which has been established.

His place was taken by Col. Harry H. Bandholtz, then assistant director in the first district. General Bandholtz has also served continuously with the constabulary since April 8, 1903, and has held the most important positions with distinction, including that of acting director, and has proved himself fully competent to take hold of the difficult duties of director.

FRIENDLY RELATIONS.

Throughout the year the feeling toward the constabulary continued to be more friendly, and most of the complaints which at one time were of common occurrence have disappeared.

The director has been very severe in weeding out undesirable officers, and the whole organization now understands the absolute necessity of harmonious relations with local officials, and that to accomplish the purpose of maintenance of order the constabulary have to get the confidence of the people whose interests they are now protecting. During the year instances have occurred where evidence was brought that constabulary soldiers and officers had abused their positions, and in some instances suit was brought in the courts against them and the matter left to the courts to determine. Even when exonerated by the courts of law, they have been sometimes required to leave the service, owing to the fact that the evidence proved that, although not criminally liable, they were not properly fulfilling the duties of constabulary officers.

During the year no scout companies have been required to serve under the insular government.

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A compilation of the reports for the past six years during which the constabulary has been in operation shows the following interesting figures:

Firearms captured	5,341
Stolen animals recovered	5,773
Number of patrols and expeditions	40,886
Number of miles covered in such patrols	1,121,239
Convictions secured	10,596
Desertions from constabulary force	250

These figures bear eloquent witness to the usefulness to which the constabulary has been put. In the year 1907 there were but twenty desertions, which, out of a force of 5,000 men, may be taken as negligible.

CONDITION OF ORDER.

The general condition of order throughout the islands is good, and there is to be found no cause for anxiety as to the peaceful condition of the archipelago. People travel from side to side unmolested and unarmed. The only outlaws who remain a menace to public order are Salvador, in the first district, and Otoy, in the third district, who will be mentioned later.

COMMENDATION OF THE SECRETARY OF WAR.

On the occasion of the opening of the Philippine Assembly the Secretary of War took occasion to give high praise to the Philippines Constabulary. The quotation from his speech, with an indorsement of the Governor-General and of the undersigned, follows:

MANILA, *October 29, 1907.*

MY DEAR GENERAL BANDHOLTZ: It affords me much pleasure to invite your attention to that portion of the speech of the honorable the Secretary of War to the Philippine Assembly, in which he alludes to the constabulary. To what he has said I wish to add that I also am highly pleased with the present efficient manner in which the officers and men of the Philippines Constabulary are performing their duties, and I believe that the constabulary to-day is one of the most valuable aids to the government in these islands.

The remarks of the Secretary of War above referred to were as follows:

"Another agency in the administration of justice has been the constabulary. When I was here something more than two years ago, the complaints against that body were numerous, emphatic, and bitter. I promised, on behalf of the Philippine government and the Washington Administration that close investigations should be made into the complaints and that if there was occasion for reform that reform would be carried out. It gratifies me on my return to the islands now to learn that a change has come, that the complaints against the constabulary have entirely ceased, and that it is now conceded to be discharging with efficiency the function which it was chiefly created to perform, of sympathetically aiding the provincial governors and municipal authorites of the islands in maintaining the peace of each province and each muncipality, and that there is a thorough spirit of cooperation between the officers and men of the constabularly and the local authorities."

Very respectfully,

JAMES F. SMITH,
Governor-General.

Brig. Gen. H. H. BANDHOLTZ,
Director of the Philippines Constabulary,
Manila, P. I.
(Through the Secretary of Commerce and Police.)

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[First indorsement.]

DEPARTMENT OF COMMERCE AND POLICE,
Manila, November 11, 1907.

Respectfully referred to the director of constabulary.

It is a great gratification to this department, and must be to all members of the constabulary, to read the strong, hearty, and unequivocal indorsement of the Secretary of War, which is approved in no uncertain terms by the Governor-General.

It is hoped that this will be brought to the notice of all officers in the constabulary service, as it will tend to give them a much more settled feeling to know that they have the confidence of the highest authorities and that the usefulness and necessity of the organization of which they are members has been set forth in no uncertain terms in so public an utterance as the address of the Secretary of War in opening the Philippine Assembly.

The fact that complaints were registered against the constabulary in the past two or three years does not necessarily mean that the constabulary were failing to perform their functions before, and the undersigned is sure that the Secretary of War would not wish to be so interpreted, but it did mean that there was room for able, intelligent, and progressive management to end the uncomfortable situation and put the constabulary where they now stand.

The undersigned, therefore, in indorsing all that is said by the Secretary of War and the Governor-General, as his personal belief wishes to extend to the director of constabulary and the corps of efficient and capable officers under him his congratulations on bringing about this condition of affairs.

W. CAMERON FORBES.
Secretary of Commerce and Police.

USE OF KRAG-JÖRGENSEN RIFLES.

Formerly the constabulary were armed with Springfield rifles, which carried but one cartridge, having no magazine and no bayonet. Several disasters have occurred to the constabulary owing to the fact that when rushed at close quarters by superior numbers lying in wait in the dense vegetation they have been able to reach the soldiers who were practically unarmed after one shot. In this way a number of reverses have occurred at the beginning of the trouble, which has resulted in encouragement to the ladrones, the capture of arms by them, and with the prestige of these successes they have induced the ignorant peasantry to espouse their cause and become lawbreakers. The constabulary are now armed with the Krag-Jörgensen rifle of the type recently discarded by the Army. They can be fired six times without reloading, and with the bayonet are adequate protection against encounters with fanatics at close quarters. This makes of the constabulary a much more efficient peace organization.

FIRST DISTRICT.

In the first district, the provinces immediately surrounding Manila, the practical extinction of the outlaw bands by the surrender, noted in my last report, of Montalan, Sakay, Villafuerte, Natividad, and de Vega, has cleared the atmosphere and made the remaining task comparatively easy. The only disturbing element now at large in Luzon is a certain religious fanatic who is at the head of the "Santa Iglesia" or "Holy Church," lives in the swamps and mountains between Nueva Ecija and Tarlac, and is protected by the barrio people, probably on account of belief in his supernatural powers. As he desists from bloodthirsty outrages and makes his levies more by playing upon the credulity of his fellow-countrymen than by threatening torture or

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ruin, his presence is not so disturbing as the outlaws south of Manila, recently captured. It is believed that it is only a matter of time, as it has proved in every other place, until these disturbing elements will be removed.

SECOND DISTRICT.

The second district has remained in continued good order, with one small attempted outbreak, due to a semireligious organization which had apparently been kept alive from the old insurrection. The foolish talk of war with Japan caused the leaders and a few members of this organization to begin a movement which received slight local support in a few towns; but the able, active, and progressive governor of the province, Mr. Quezon, took the field in person, dismissed the officials of the town of Atimonan, who had connived at this movement, and assisted the constabulary in breaking up this thing before it had time to gather headway. Col. J. G. Harbord, the district director, was slightly wounded with a bolo in an encounter with the band, an event which he was too modest to notice in his official report.

The island of Samar, which is rapidly approaching an entirely peaceful condition, was added to the second district during the year. The headquarters of this district has been moved to Albay, which is more nearly central to the new distribution of responsibilities. There are outstanding a few scattering pulahanes with a bare score of guns. The depredations have ceased, and the people of the affected regions have all returned to agriculture.

THIRD DISTRICT.

The third district, which includes Leyte, is now in an entirely peaceful condition. The last outlaw known to be at large in Leyte has now been reported captured, and there are no guns known to be out. Complete peace now prevails.

In Cebu, under the wise and aggressive administration of Governor Sergio Osmeña, every effort was made to end the condition of lawlessness which had prevailed for many years in the mountain sections of the island, and the last outlaw came in and surrendered.

In Occidental Negros, Papa Isio, who for so many years terrorized the island, was brought to surrender, which practically breaks up the main element of lawlessness of that island. There are still a few guns outstanding and some few men, who wish to live by depredation rather than by toil.

In the island of Panay the district director reports that conditions are not so good. In the mountains there are several bands who make carabao stealing a business, and as yet the constabulary have been unable to break them up. The continued work, however, of the constabulary is having its effect, and it is fair to say that throughout the third district there is more orderliness than ever before.

FOURTH DISTRICT.

In the fourth district the favorable conditions continue. In the past year several new subprovinces have been created, usually with American governors, to look out for the interests of the non-Christian tribes scattered throughout that country. These subprovinces

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are assisting materially in maintaining the orderliness of these people, whose disorders have usually been confined to local feuds, and one or two new posts of constabulary have been established to assist in this important and beneficial work.

FIFTH DISTRICT.

In the fifth district the constabulary are assuming more and more the functions of maintenance or order. The district director reports to the civil governor of the Moro Province, who is also the general commanding the United States Army for that district. The constabulary are being given a greater and greater proportion of the peace duties, and have made an unusually creditable record.

For further information in regard to the bureau of constabulary and its operations for the fiscal year, attention is respectfully called to the report of the director of constabulary, hereto attached and marked "Appendix A."

RAILROADS.

The position of supervising railway expert was created, at a salary of ₱24,000 per year, by virtue of act No. 1507, passed June 29, 1906. Mr. F. A. Molitor took the position, but resigned on March 31, 1907, and Mr. L. F. Goodale arrived shortly after to take his place, and commenced his duties on April 16, 1907.

MANILA RAILROAD COMPANY.

The concession to the Manila Railroad Company was formally accepted on August 28, 1906. A waiver and release of all claims arising under the operations of the old companies was necessary before the old concession could be declared to be terminated. These waivers were submitted to the Secretary of War on February 25, 1907, were returned to London for completion, and were finally accepted on April 24, 1907, upon which date the old charters went out of effect and the provisions of act No. 1510 became effective for the old lines of the Manila Railroad Company and its branches.

During the year work on the new system has been pushed with remarkable energy and activity. In Luzon, on June 30, 1907, 340 kilometers (211 miles) of surveys had been completed, 313 kilometers (194 miles) submitted for approval and approved by the Governor-General, 128 kilometers (79.5 miles) of grading done, 38 kilometers (23.4 miles) of track laid, and 26 kilometers (16.1 miles) of new road certified to be open for operation. As the company had until September 7, 1907, to complete its surveys, and two years thereafter in which to complete its first 150 miles, it can be readily seen that the Manila Railroad Company is pushing its construction far in advance of the requirements of the franchise.

The work done up to the date of this report includes the construction of a line from Dagupan to Camp One, approaching completion; construction of the San Fernando-Florida Blanca branch, one-half completed; Dao-San Pedro-Magalang line, completed and in operation; extension of the road to within 9 kilometers (5.6 miles) of Antipolo; construction of terminals on the Pasig River at the point where the road crosses from the Santa Mesa region to the Paco dis-

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trict; preliminary arrangement of location of terminals in the city of Manila; construction of grading from Manila as far as Cavite Viejo and from Manila to Calamba on the Batangas line. Surveys have been in progress on the Albay branch, but the work of construction has not been begun.

The location provided under the law for railroad lines in the provinces of Albay, Ambos Camarines, and southern Luzon was found to be impracticable, as the line from Ligao to Tabaco involves too expensive construction. Accordingly the railroad company has requested and obtained a change of concession, eliminating the expensive part of that line and making connection of the main line with Tabaco from Legaspi. The rich hemp regions adjoining Tabaco and Ligao are to be reached by short branches.

The port of Pasacao was proved by investigation of engineers to be unsuitable for a terminus and the construction of a line to that port has been abandoned. The railroad company contracted to extend 7 miles to the north from Nueva Caceres toward the Gulf of Ragay, in which several good ports are to be found, one of which will undoubtedly be reached by the proposed railroad line. This brings the northern terminus of the Albay line much nearer Manila and renders it morally certain that the interests of the railroad company to make the connection will be so great as to justify the belief that the connection between the southern end of the Manila lines and the northern end of the Albay lines is a certainty in the not too distant future.

The Commission has enacted a law authorizing the Governor-General to advertise for bids for the construction of a line to Baguio and to execute a concessionary contract upon terms that should attract bidders.

Investigation goes to show that electric traction can be made to operate successfully on the present roadbed, which, however, would involve a very considerable expense. It is believed that the presence of a large army post at Baguio would justify this expense, and the establishment of such a post has been recommended by men highest in authority here and in the War Department. Indications are that the construction of a line to Baguio will soon be undertaken.

Gross earnings of the Manila Railway Company, 1893–1906.

1893	₱500,000	1900	₱725,000
1894	550,000	1901	1,300,000
1895	600,000	1902	1,200,000
1896	600,000	1903	1,575,000
1897	725,000	1904	1,476,000
1898	775,000	1905	1,916,000
1899	175,000	1906	2,038,000

PHILIPPINE RAILWAY COMPANY.

In the Visayan Islands the Philippine Railway Company has shown commendable energy in pushing construction to early completion. It was found that were the government to wait for final plans before allowing the railway company to begin construction that it would be impossible for the company to build its lines in time to comply with the terms of the concession. This was particularly so in regard to orders for rails, engines, structural steel for bridges, etc.,

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from the United States, to secure which it is necessary to send in the orders long before the time for expected delivery. This led to the system of preliminary approval, by which, on the recommendation of the supervising railway expert and this department, the Governor-General authorizes the railway company to order a certain standard of articles previous to the submission of final plans as provided under the terms of the concession. Preliminary approval was also given to the railway company to secure terminals in Cebu and Iloilo.

At the end of the fiscal year the company had completed in Cebu 45 kilometers (28 miles) of grading, 152.8 kilometers (95 miles) had been surveyed, and the location of 96.7 kilometers (60.1 miles) had been approved. In the island of Panay 160.9 kilometers (100 miles) have been surveyed, 28.97 kilometers (18 miles) have been graded, and 71.93 kilometers (44.7 miles) have been approved. In Negros 96.5 kilometers (60 miles) have been surveyed.

The Philippine Railway Company has estimated that part of the line which they are under contract to construct in northern Negros will not pay a sufficient profit to justify its construction, and it has requested relief from the contract to build such section of the line. The abandonment of this section will leave them without any harbor terminal at any point in the island. It is proposed to meet this objection by the construction of a long pier to the open roadstead nearest to Iloilo, situated at Bacolod, from which they will have ferry connection with Iloilo. The government is ready to relieve the company from the necessity of completing this northern Negros line, in so far as can be done by executive action and without modification of the franchise by act of the legislature, but wishes, if possible, to secure a contract from the railway company to build an equivalent amount of railroad to reach some port for which no contract has as yet been signed. It is possible that a line from near Bacolod across the island of Negros to some point on the east coast, perhaps near San Carlos, where there is a fair port, can be constructed at reasonable cost and with sufficient probability of profit to justify its construction. The government believes it for the interest of the islands that the railway people should be satisfied with their investment, and to that end is not inclined to press the construction of lines which careful study has shown will probably be unprofitable and will be a drag on the rest of the system. It is, however, of the utmost importance that the rails on each island should reach some deep-water harbor.

The representatives of the railway company and of the government have been disappointed to find that the first cost of the road will exceed the original rough estimates, and is likely to cost somewhere from ₱55,000 to ₱68,000 per kilometer ($45,000 to $55,000 per mile). It has been necessary for the government, in view of the increased liability which this will make on the guaranty fund, to exercise most careful supervision and to make a most thorough inspection of the accounts so as to be able to certify that the money thus spent has been expended wholly for the benefit of road construction. This inspection has shown that the money has so far been expended for the purposes necessary for the economical operation of the road, and the proportion of expenditures which up to date has not been allowed has been comparatively small.

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MANILA ELECTRIC RAILROAD AND LIGHT COMPANY.

On January 30, 1906, under act No. 1446, Charles M. Swift was granted a franchise for an electric line from the existing lines in Manila to Pasig. Later this franchise was transferred by Mr. Swift to the Suburban Railways Company, a subsidiary corporation of the Manila Electric Railroad and Light Company.

The above franchises by act No. 1589, of February 1, 1907, was extended to include a branch to Taguig and the Laguna de Bay.

The operation of the branch of the Suburban Railways Company to Fort McKinley was commenced on April 18, 1907. The bridge across the Pasig for the Pasig branch is in process of construction.

The main line of the Manila Electric Railroad and Light Company has now been in operation for a period of a little over a year and has proved eminently successful. The cars are run by Filipino conductors and motormen, the service is steady and satisfactory, and the company prosperous.

PANIQUI AND CAMILING RAILWAY.

This small railway, which received its franchise by act No. 1448, passed February 1, 1906, had completed up to June 30, 1907, about 19 kilometers (11.8 miles) of grading, laid 17.7 kilometers (11 miles) of track, and completed 20 kilometers (12.4 miles) of surveys. This railway has been built with local capital and will be operated with the assistance of the Manila Railroad Company, they to supply small engines for traction and some of their cars for the use of the branch company. Much creditable work has been done on embankments and grading. The rails used are 11.3 kilograms (25 pounds).

The question of the advisability of granting franchises to construct steam roads on public highways is one of doubtful merit. There is no room in the ordinary country road for a team and train to pass safely. It is believed that, while transportation is deemed to be the most crying need of the country, roads operated by steam traction should be compelled to get their own right of way, leaving the highways for their legitimate and original uses.

For further information and details attention is invited to the report of the supervising railway expert, hereto attached and marked "Appendix B."

BUREAU OF PUBLIC WORKS.

The bureau of public works has completed its first full year in the new form which was given it by the reorganization act, No. 1407. The general policy under the new system has been to centralize all the constructing work in the bureau of public works with certain exceptions, such as construction of light-houses and port works now under the bureau of navigation, the work done by the city engineer's office in the city of Manila, and the sewer and water works of the city of Manila, now handled by a special officer.

The government has undertaken the policy of letting contracts for most of its work, the director of public works preparing the plans and specifications for the engineering work and the consulting architect the plans and specifications for all architectural work, such plans being turned over to the bureau of public works, which makes the con-

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tract and oversees the work. The system of district engineers adopted at the time of the reorganization of the government abolished the position of provincial supervisor and placed the supervision of provincial construction under the bureau of public works. The position of the district engineer as regards municipalities, however, is merely advisory. The following table shows the economy of this change:

	Value of work accomplished.	Cost of superintendence.	Per cent cost of value.
	Pesos.	*Pesos.*	
Old system, 1905	824,148	161,690	19.6
New system, 1906	865,502	121,767	14.0

The present regulations provide that the actual cost of supervision up to 10 per cent of the total cost of the work shall be charged against provinces and municipalties. Of the total cost of supervision under the new system during the year 1906, only ₱36,475 can be collected from provinces and municipalties, leaving ₱85,292 to be borne by the insular government, hence the average cost for superintendence to the provinces and municipalities was only 4 per cent of the total cost of the work.

ROADS.

On July 13, 1906, act No. 1511, the so-called road law, was passed, authorizing provinces and municipalities to compel every person liable to the payment of a cedula to work for five days in each year on the roads or pay a commutation in lieu thereof. The hostility of the people of the Philippine Islands to this measure soon became very pronounced. Although assurances had been received from local governors that the law would be accepted, the conventions of municipal officials in the provinces of La Laguna, Surigao, Ambos Camarines, Albay, and Bohol in each case refused to accept the law by such an overwhelming majority that it was soon evident that the people were not ready to adopt this means of bettering their roads.

The absolute necessity for good roads, however, has grown more and more apparent. Roads constructed or repaired by the insular government and turned over to the provinces and municipalities to maintain within two or three years have become absolutely impassable. The first two or three years after the construction of the road are often the most important years from the point of view of maintenance. The soft places in the road develop, the rock sinks in spots, and soon the continued traffic cuts through the shell of road material, and the puddle made by the depression of the road surface soon becomes a sink pit, in which the road material for the whole width of the road sinks and is lost. A little work at the outset filling up the depressions as they appear, keeping the surface of the road crowned, making sure that the ditches and culverts are kept clear and that the water does not go running down the road in ruts instead of off to the side, as it should from a properly crowned surface, would make the difference between having a good road and having none at all.

In my last two annual reports I called attention to the fact that much of the construction which had been done by the Americans has been allowed to deteriorate. This has continued until at the pres-

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ent time, with few exceptions, the condition of the roads throughout the archipelago is lamentable and is growing worse from day to day. What were good and passable roads three years ago are now quagmires in the rainy season, and throughout the past year it has become evident that to avoid a paralysis of industry in many districts a drastic change of policy is needed in regard to road construction and maintenance. Failure of the road law brought the Commission face to face with this serious problem, and every opportunity which the secretary of this department has had to travel in the provinces has been utilized in visiting provincial and municipal officials, traveling over the roads, and urging and exhorting them to establish the proper system of continuing road maintenance. The main difficulty has been the lack of resources. In many cases local officials were willing, but had not the authority of law to obtain the funds necessary for this important work. In the Tropics the problem of road maintenance is doubly hard. The luxuriance of vegetation is such that, unless prevented, a whole road is likely to be obliterated in the course of six months by encroaching vegetation. The rainfall is often so torrential in its nature that it is very difficult to figure on the maximum amount of water to be drained. The path of an unusual typhoon or a combination of two typhoons at the same time may cause a downpour of rain amounting almost to a cloudburst at some unexpected point, with resultant loss of road or bridge or whatever construction lies in the way.

The failure of the provinces to accept the provisions of the road law (act No. 1511) necessitated new measures. The first measure for the relief of this situation was taken by the Commission in Baguio in the passage of act No. 1617, which provided that any province, with the approval of the Governor-General, could declare certain specified roads toll roads for a period not to exceed five years. In this way the cost of maintenance of a road could be made to become a direct charge on the people who used it most. But one province has availed itself of this authority, namely, La Laguna, where the San Pablo Bay road was made a toll road to provide funds for the maintenance, which it is estimated will cost ₱15,000 a year.

Objection had been raised in some of the provinces to the road law because there was no provision for its repeal or suspension by either provinces or municipalities once it was accepted. To meet this objection act No. 1653 was enacted, which authorized provinces to accept the provisions of the road law for a definite period of time, and in addition gave a similar power to municipalities.

The real remedy, however, of the situation was found in the passage of act No. 1652, which authorized the provincial board of any province to double the cedula tax for that province. This differed from the old road law in that the money was to be used under the direction of the provincial board and in their discretion, and not under the direction of the presidents of the municipalities. In case of failure to pay, the value of the money could be worked out on the road at a given price. Provinces were not quick to avail themselves of the opportunity thus offered to them, and by the time the annual appropriation bill came around the attention of the Commission had been thoroughly called to the absolute necessity of some definite and general action in regard to the establishment and continuance of an

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effective system of road construction and maintenance. At the same time the Commission desired to interfere as little as possible in the autonomy of the provinces and municipalities. The provinces during the year have been made practically autonomous, having now two-thirds of the provincial board elected by the people instead of two-thirds being appointed by the Governor-General. It makes the difference in provincial boards of which two-thirds are Filipinos instead of provincial boards of which two-thirds were usually Americans.

Although desirous of leaving the matter of road maintenance as far as possible in the hands of local officials, it was obviously necessary to find some way of inducing the provinces to accept the double cedula tax and to get a pledge that all roads constructed would be maintained without possibility of deterioration. The department has made a careful study of the problems involved and has reached the conclusion that the most practical way of solving the matter is by a system of insular aid, given on condition of a proper maintenance system being established, under the penalty, in case any roads are found to be deteriorating, of the money for the upkeep of the same being turned over to the director of public works and the road maintained under the direction of the insular government. The administrative power of the Governor-General to remove officials neglecting their duty is also a very powerful agency in compelling attention to this important detail. The system of maintenance determined upon is generally known as the "caminero" system, which provides for the division of the roads into sections of such length as can be cared for properly by one man continuously at work. This road man, or caminero, is charged with the duty of working continually upon his section, of keeping back encroaching vegetation, and of keeping the culverts clear and the road properly crowned, using approved material only for the filling of depressions or ruts; and it is hoped that provision will be made to grant police authority to the caminero in so far as matters pertaining to the maintenance of roads and bridges and keeping them open for use is concerned. He should have the power to prevent the use of roads by narrow-tired carts, the obstruction of the road by vehicles or other structures or articles, the stealing of planks or bolts from bridges and of rock or gravel from other parts of the road, and should notify central authorities instantly in case of any occurrence resulting in damage to the road to an extent beyond his powers to remedy within a reasonable and prescribed period of time. The system also involves the deposit of road material approved by competent authority in places designated for the same alongside the road at short distances, which are to be kept filled for use by the caminero in his work, and it should be unlawful to put any other kind of material on the road. This will put an end to the very pernicious system now very prevalent of maintaining the road with vegetable matter or mud taken from the roadside. It is hoped that each province will have road gangs in addition to the camineros, and rock crushers, steam rollers, traction engines, and cars, in order to have adequate and economical machinery with which to carry out the details of road construction and maintenance.

To accomplish these results the Commission determined to make a very considerable appropriation for roads, conditional upon the acceptance of the double cedula tax, and in furtherance of this plan act

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No. 1695 was passed, which authorizes 10 per cent of the internal-revenue tax to be divided proportionately to population among those provinces which accepted the double cedula tax. The money which should go to those provinces which do not accept the double cedula tax will be added to the fund of those provinces which do accept it. In addition to this the Commission made an appropration of ₱1,321,225 for roads and bridges, ₱821,225 of which was for specific road projects, and ₱500,000 to be allotted in the discretion of the secretary of commerce and police, the money for specific road projects to be available only for those provinces which entered into a contract for continuing road maintenance under penalty, in case of failure, of having to pay over a certain amount of money to the insular government and having the work done by the bureau of public works. The ₱500,000 to be allotted by the secretary of commerce and police has been proportioned among those provinces which do not receive specific amounts, and is allotted on condition only that the provinces enter into an agreement for the maintenance of all first-class roads in the province, said first-class roads to be designated by the director of public works, and that they agree to appropriate a given amount each year for each section and to maintain all roads in good order with the caminero system, under penalty, as before indicated, that the director of public works may take over the maintenance in case of failure. It is hoped that the policy will be established here that no officer can hold his position if he fails to maintain a road which has been intrusted to his care with sufficient funds to properly perform the work; that the criterion will be the condition of the road; that each section will have the exact condition in which it was left when it was completed noted, and that in case any deterioration is noted one month's notice shall be given to the local official, and if at the end of that time he has not properly fulfilled his duty, as sufficient funds should be appropriated for each section of the road to leave ample margin for contingencies, the burden of proof will be on the delinquent official to prove that the deterioration of the road was due to extraordinary and unusual causes; that the Governor-General will prescribe the strictest kind of procedure and make the official's tenure of office dependent upon his maintenance of this absolutely vital requirement for the life and prosperity of the people under his care.

The result of the inducements offered to the provinces to accept the double cedula tax was remarkable. All but four of the provinces have had the good sense, wisdom, and courage to accept the law doubling the cedula tax, and thus enabled themselves to participate in the ₱2,000,000 of insular money made available for road purposes by acts Nos. 1688 and 1695. The increased cedula tax in those provinces where it has been doubled will amount to a grand total of about ₱1,500,000 a year, which, with the new insular aid and the old road and bridge funds, should these measures continue in effect, each year will give an annual amount for road building of rising ₱4,000,000, or considerably more than five times the largest amount available for the expenditure on roads in previous years.

The four provinces that have not had the wisdom and foresight to avail themselves of the privileges of this road construction are Bulacan, Cavite, Tarlac, and Nueva Ecija. It is hoped that these provinces will realize in another year what will inure to the best interests

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of their people and will join their sister provinces in the new era of road development.

THE USE OF WIDE-TIRED CART WHEELS.

The law in regard to wide-tired cart wheels has not been pressed to the point that it should have been. The manufacture of such wheels in Bilibid did not meet with as ready a sale or as growing a demand as it should have. The result has been that there has been a very slow disposition of the wheels on hand. Recently, however, with a marked revival of interest in the question of roads, the demand is steadily increasing for the wheels made by convicts. A plan has been adopted in the province of La Laguna, where the provincial officials are particularly active in their efforts to establish a proper system of roads, of offering to carabao owners a wide-tired cart made in Bilibid as payment for a month's work in hauling road material. This is an inducement to the owners of these animals, it helps build the road, and does its part toward bringing in the wide-tired carts, which have a good effect in maintenance.

It is only fair, in passing, to speak of the good work which has been done in certain provinces toward road construction. During the year 276 culverts and 32 bridges of reenforced concrete and 5 bridges of steel have been built.

IRRIGATION.

The value of irrigation is nowhere better shown than in the case of the friar lands recently purchased by the government, where the irrigating plants form a valuable part of the assets of the property in those estates which have them and add marked value to the land. Not only does irrigation increase the crops which can be taken from the soil in good years, but it is also an insurance fund against dry spells during the usual season for crops, such as is occurring at the time of the present writing in some provinces in Luzon, and the Commission has at last taken action in this matter and has appropriated ₱250,000, to be allotted in the discretion of the secretary of commerce and police, for irrigating projects, and ₱57,275 for special projects, most of which are for the development of the friar lands. The water made available by the irrigation system which it is proposed to establish will be leased in such a way as to provide a revenue to the government, which will be used as a reimbursable fund available for further irrigation enterprises. It is believed that with the extension of this system the advantages will become so apparent that the government will continue to add to this fund from year to year, making a minimum annual appropriation of, say, ₱250,000, and in the course of time the development of irrigation works in accordance with this plan should become a very important branch of the government enterprise.

In this connection attention is called to the great productiveness of the province of Pampanga, a province where irrigation works on a large scale are now in operation. The provinces of Tarlac and Pangasinan are capable of similar development, and many places throughout the islands will be found that will respond freely to this expenditure of money.

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WELL BORING.

During the year thirteen wells were dug, of an average depth of 53.28 meters, at an average cost of ₱1,537 and with an average delivery of 264.7 liters per minute. Of these thirteen wells, five gave flowing water. The good results of these wells have been such as to justify the Commission in ordering two additional well-boring outfits, one of which was ordered last year, but, through mistake, has not yet been received; the other has been appropriated for this year. The sum of ₱37,000 has been made available for these works, and the Commission, in view of the very great importance of the work and the beneficial results from a sanitary point of view, has determined to charge only the actual cost of the successful wells, the insular government to bear the expense of those which fail to find water. Thus the municipalities are assured that either they will get a supply of water or that they will not have to pay. This was determined upon in order to encourage municipalities in the desire for this very marked improvement. Twenty-seven requests are now on file for artesian wells, and there is no doubt whatever but that the three outfits will be kept continually busy.

PERMANENT CONSTRUCTION.

The policy outlined in the preceding report of the use of the superior qualities of Philippine woods in the construction of all edifices of permanent materials has been rigidly adhered to. A reenforced-concrete building constructed here costs from two to three times the cost of a building of Oregon pine, which is pretty sure to be rotted inside of ten years and on an average within six years. The cement is practically permanent, and with reasonable care and less maintenance expense than the other may be expected to be as good at the end of fifty years as it was when built. Taken on a fifty-year basis, therefore, one sees that the Oregon pine building is an extravagance too great for a poor country.

BENGUET IMPROVEMENTS.

During the fiscal year 1907 the development of Baguio has received a marked impetus. All lots offered for sale have been sold, a new hotel has been constructed, the Hotel Pines largely increased, and visitors seemed to enjoy their visit to Baguio, and the people who avoided the heat of Manila in the new city have shown some enthusiasm. Camp John Hay, the military post in Baguio, has instituted the construction of an admirable system of roads and has completed a careful parking of an important section of their reservation, where also a number of new buildings and places of amusement have been constructed and a number of tents set up for the use of army officers and their families. The Commission appropriated ₱30,000 for the construction of a suitable residence for the Governor-General and established the policy of maintaining such residence for him in Baguio. A section of 10 hectares was laid aside for a park surrounding the Governor-General's residence. The contract was let on December 5, 1906, the house to be ready for occupancy within the ensuing year. The site for a permanent park has been selected and reserved,

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and a base-ball field prepared for public use. A country club has been established by private enterprise, and has been provided with golf links, clubhouse, tennis courts, and other opportunities for entertainment.

A number of very beautiful drives and roads have been provided and made available for the use of visitors. The money for the roads came from the sale of lots, and no appropriation of insular money was made during the year for Baguio improvements. These roads are merely cut in the clay, and are therefore very cheaply built and can not be used for heavy traffic during the rainy season. They need to be carefully improved and metaled, as the rainfall at Baguio during the rainy season is excessive and most trying on road construction. One of the most gratifying results of the season has been the interest taken by Filipinos in Baguio. Many of them came up during the year and expressed themselves as being surprised and delighted with the change of climate and were optimistic in regard to its use and future. The Society of Jesus have purchased a site for a sanitarium and observatory of something over 8 hectares, where they are proposing to put up a rest house and sanitarium. The archbishop of Manila has built a private residence on a fine, commanding hill overlooking the canyon of the Bued River, and a number of other private residences have been constructed or are now in course of construction.

BENGUET ROAD.

The Benguet road has stood satisfactorily throughout the year. The process of improvement of the road and of replacing the temporary wooden bridges with stone and cement ones has steadily progressed. The road has been kept continuously open, with the exception of a few periods of a few hours each when it was closed for repairs of a minor nature. The traffic has been very heavy and has taxed the surface and the organization for its maintenance. The caminero system, elsewhere described, has been put in operation here with marked success.

For further information and details attention is invited to the report of the director of public works, attached hereto and marked "Appendix C."

CONSULTING ARCHITECT.

The following general summary indicates clearly the magnitude of the work intrusted to the consulting architect:

1. *Manila.*—The laying out of the park system, treatment of the old walls, and the arrangement of streets, roads, and boulevards in and about the Luneta Extension and the filled-in land (on which it is hoped that soon the construction of warehouses and other business buildings will begin).

2. *Baguio.*—The laying out, parking, and general development of the town site.

3. The preparation of a comprehensive plan for development of other sites and towns (locally known as "Burnhamizing").

4. The preparation of plans for all important public buildings of a public character constructed by the insular, provincial, and municipal governments.

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In addition to this government work the consulting architect is authorized by the law creating his position to do work for private parties and to receive remuneration therefor. This was done because many of the most dignified, important, and imposing buildings in the city will be constructed by private parties, and in order to make a city of harmonious lines and architectural beauty the government is wisely affording the opportunity to have them properly and uniformly treated. The most notable of these buildings are the proposed new hotel on one wing of the Luneta Extension, the clubhouses for the Elks and the Army and Navy Club on the other wing, and the terminal railroad station for the Manila Railroad Company.

The consulting architect has constantly adhered to the policy, elsewhere outline, of making all buildings and structures of permanent and durable material. As a result a very considerable proportion of the construction now under way is of reinforced concrete.

The following summary indicates the government work done by the consulting architect during the past year:

Complete working plans prepared for 36 projects, aggregating	₱961, 424. 50
Complete plans and specifications in course of preparation for 25 projects, aggregating	694, 396. 00
Preliminary plans and estimates submitted for 13 projects, aggregating	1, 538, 000. 00
A total of 74 projects, involving a total of	3, 193, 820. 50

For further information and details attention is invited to the report of the consulting architect, attached hereto and marked "Appendix D."

BUREAU OF POSTS.

This important part of the government service now includes the whole government business of transmitting communications by means of posts, telegraph, telephone, and otherwise.

The table appended will show five years' operations of this bureau. In the first two years, 1904 and 1905, and part of 1906, the operation of the telegraph lines was under the control of the constabulary.

Part of the good financial showing which is made is due to the fact that by combining the position of postmaster and telegraph operator marked economy was obtained, although before the change went into effect it is true that the constabulary had the compensating advantage that they could use enlisted men for line inspection and repairs. It is believed, however, that the present good financial showing as given in the appended statement fully justifies the change which was made in 1906.

Originally the telegraph and the telephone service was constructed and operated by the United States Army, at the expense of the United States Government, and as a military necessity. The Commission has hesitated a long time before taking over these lines, as it felt that the demands upon the insular treasury were so great that it could ill afford the heavy additional expense of maintaining unprofitable telegraph lines. The cost, however, to the United States Army was so great for the maintenance of these lines that with the era of economy which has been inaugurated it became evident that many of the telegraph and cable lines would be abandoned as no longer necessary for military purposes if not taken over by the insular government.

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Negotiations extending over a period of eighteen months finally culminated in the approval by the Secretary of War of the general plan of transfer arranged between the commanding general of the Philippines division and the secretary of this department, which provides that the Army should have a cable ship in the Philippine Islands for a period of two years from October 4, 1907, the date upon which the transfer was approved by the Secretary of War, the expense of the maintenance of cable, however, to be borne by the insular government, and that the insular government should give to the Army free service for a like period, after which the Army will be upon the same basis exactly in regard to payment for service as the bureaus and offices of the insular government and private individuals, and then the insular government may have to supply its own cable ship. The appraised value of the lines transferred is approximately ₱1,094,391.

The mileage of the insular telephone, telegraph, and cable lines at the close of the fiscal year was 8,105.24 kilometers (5,036.5 miles). Since the close of the fiscal year 1907 there has been transferred from the United States Army 2,948.3 kilometers (1,832 miles) of telegraph and cable lines, so that the total mileage of wires under control of the bureau of posts is now 11,053.54 kilometers (6,868.5 miles).

COST.

Attention is invited to the fact that on January 1, 1906, the bureau of posts ceased giving free service for any kind of transmission, except to the United States Government, in return for free service received from the Army over their lines, and as a result the figures of the past one and one-half years show the real operations of the bureau and give a better idea of the real cost. The figures are quite gratifying, especially in view of the fact that the gross cost of ₱1,388,000 estimated for the fiscal year 1908, for which appropriation has been made, includes the establishment of a rural free-delivery system, which will cost ₱100,000 to operate, the cost of establishing and maintaining the Postal Savings Bank, estimated at ₱60,000 per year, and in addition the new expense incident to taking over the army telegraph and cable lines.

The total cost of operating the bureau of posts for the fiscal year 1907 was ₱1,035,223.13. It is believed that the bureau of posts has been managed in a most thorough, competent, and careful manner, and upon a thorough business basis.

NUMBER OF POST-OFFICES.

At the beginning of the fiscal year 476, and at the end thereof 505 post-offices were in operation.

NEW POSTAGE STAMPS.

The new postage stamps were received from the Bureau of Engraving and Printing in August, 1906, and now the Philippine Islands have a distinctive set of stamps, different from those of the United States.

PERSONNEL.

The personnel of the bureau has increased during the fiscal year from 1,003 at the beginning to 1,091, an increase of 88 employees.

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There was a decrease of 13 Americans and an increase of 101 Filipinos, an increase in the percentage of Filipinos from 78 per cent at the beginning of the fiscal year to 81 per cent at the end thereof. The proportion of Filipinos has not been increased more rapidly, because in taking over the telegraph lines it has been impossible to substitute Filipinos for American operators until Filipinos capable of handling the difficult duty of taking messages in English correctly have been educated. These figures, of course, do not include 252 mail carriers and contractors, substantially all Filipinos.

REGISTERED MAIL.

The registration of mail shows the total number of pieces of mail registered during the year to have been 280,044, as opposed to 245,831 registered in the previous year, an increase of 13.9 per cent.

MAIL CONTRACTS.

The acceptance by the Manila Railroad Company of the new concession granted by act No. 1510 and the assumption of the obligation therein contained to construct over 400 miles of new railroad in Luzon terminated the old Spanish concession, which provided for free mail service, and in the future the bureau of posts will have to pay for the transportation of the mails over all railroad lines in the islands.

MONEY ORDERS.

The money-order business continues to steadily increase. The number of offices increased from 60 to 63. The number of money orders issued increased from 94,261 to 98,813, but the amount of the orders issued decreased from $3,687,126.81 to $3,229,446.09. The average amount of each money order issued decreased from $39.10 to $32.69. It is possible that some of the decrease in money orders is due to the establishment of the postal savings bank, in which money is now deposited at interest which before was held by the post-office without interest for people who bought money orders payable to themselves at Philippine post-offices as a device for getting it kept safely.

POSTAL SAVINGS BANK.

The postal savings bank was first opened in Manila on October 1, 1906. The law provides for three classes, with limitations as to the amounts that can be received at any one time in each class. Following the opening of the Manila office other postal savings bank offices were opened in various cities, of different classes, until at the close of the year 235 had been opened, of which 9 were first, 86 were second, and 140 were third class. At first the Filipinos did not to any great extent avail themselves of the opportunity of depositing a portion of their receipts in the postal savings bank, and the great bulk of the depositors were Americans or other nationalities. As the advantages of this system have been disseminated through means of schools, government bureaus, private agencies, and others, the proportion of Filipinos is continually increasing, and gives very

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good promise that the Filipinos will learn to trust their money to the care of the government and welcome the opportunity.

The accounts opened up to the close of the fiscal year number 2,676, of which 347 were closed, leaving 2,329 still open. The deposits reached the total sum of ₱786,361.03, an average of ₱108.21. Withdrawals reached the total amount of ₱280,499.21, leaving a net deposit of ₱509,463.34 at the end of the fiscal year, or the first nine months of the operation of the postal savings bank, but by no means the first nine months of operation of the average number of offices, the smaller ones having been opened from time to time during the year, so that many had not been opened more than a month or two at the time these figures were taken.

At the close of the fiscal year depositors were as follows: Americans, 1,616, or 60.4 per cent; Filipinos, 944, or 35.3 per cent; others, scattered between Europeans, Asiatics, and societies.

In the report of the bureau of posts other methods of classification will be found which will be of interest. Of the 2,329 accounts standing at the close of the fiscal year, 50 are standing open with no balance, and 1,155 will be found to be of less than ₱50 in amount. Seven hundred and twenty-two of these are accounts of Filipinos.

POSTAL SAVINGS BANK STAMPS.

The device of issuing postal savings bank stamps has met with some response. They were not put on sale until February of this year, and it is believed they will be greatly appreciated by people of small means and school children. No original deposits of less than ₱1 are received, nor can a book be issued for less than that amount. The stamps are simply a method by which small amounts can be deposited without the expense of issuing a book, figuring interest, and opening an account. Each post-office at which a postal savings bank has been opened has for sale postal savings bank stamps of the denominations of 5, 10, and 20 centavos, which can be sold and accounted for as are ordinary postage stamps. A child purchasing receives a card upon which to stick the stamps, with spaces for enough stamps of the denominations selected to fill out the amount of ₱1, and upon filling in all the blank spaces of his card with appropriate stamps, deposits his card, which is received as cash by the postmaster and a postal savings bank book is issued to the amount of the deposit and an account is opened in the office with the owner of the book. An effort is being made to advertise the use of these stamps through schools, hoping in this way to reach the people.

INVESTMENT OF POSTAL SAVINGS-BANK FUNDS.

On the whole, the reception accorded the postal savings bank has been gratifying and gives good promise. The investment of the funds is in the hands of a postal savings bank investment board, which carries a certain amount of the funds on deposit, and has limited power of investment. The law provides that 25 per cent of the money held on deposit may be loaned on first-class real estate, under limitations carefully drawn to protect the depositors, and 10 per cent on agricultural lands under still more rigid limitations.

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Operation of the bureau of posts, fiscal years 1904–1908.

	1904.	1905.	1906.	1907.	1908.
	Pesos.	*Pesos.*	*Pesos.*	*Pesos.*	*Pesos.*
Expenditures	902,048.71	936,647.25	893,268.21	1,145,575.33	[a]1,310,000.00
Receipts	384,493.39	393,080.95	545,654.74	583,919.30	[a]700,000.00
Net cost	517,555.32	543,566.30	347,613.47	561,656.03	[b]610,000.00

[a] Estimated. [b] Appropriated.

These figures have been prepared to show the comparison between the different years' operations of the post and telegraph service. They will not agree with the figures of the bureau of posts shown in previous reports, because the telegraph service was at that time in whole or in part under other bureaus.

For further information and details, attention is invited to the report of the director of posts, hereto attached and marked "Appendix E."

BUREAU OF NAVIGATION.

The bureau of navigation has had an eventful and progressive year. Attention is called to the following table of comparative expenditures and receipts operating for a period of four years:

Division of vessels.

Year.	Expenditures.	Receipts.	Net expenditures.
	Pesos.	*Pesos.*	*Pesos.*
1904	1,298,892.60		1,298,892.60
1905	1,159,342.28		1,159,342.28
1906	1,059,770.62	192,091.85	876,678.77
1907	866,479.85	450,295.48	416,184.37

This bureau, perhaps more than any other, has demonstrated the beneficial results, from an economic point of view, of having each bureau pay for the services it receives from the other bureaus of the government, and at the same time of having all the steamers of the government under one administrative head.

The government is now operating eight less steamers and six more launches than in the fiscal year 1905, before the reorganization went into effect. Of these, the coast-guard cutters were operated at an expense of some ₱50,000 per year each, and at the same time were operating to the direct disadvantage of the commercial lines. Of the nine steamers operating at the present writing, three are operating on regular routes and two are light-house tenders. The steamers operating on regular routes are taking the business of the public, but are so operated that they do not come into competition with commercial vessels. The result of the operation of the division of vessels shows profitable and advantageous use of all vessels now kept in commission, and by the constant supervision of the condition of the vessels a high standard of efficiency is continually being kept up.

The operation of steamers on contract routes has proved a very decided success. Merchants find that they now can get regular service at known rates, which can not be changed without previous approval by the government. They know beforehand the exact ports

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of call which are to be made by each steamer and do not have their goods unnecessarily refused at the ship's side. People can calculate in making their journeys what time the steamers will arrive to take them and know to what ports they can go and what the connections will be. This has a tendency to increase passenger traffic, and this department has been informed by the shipping people that the result has gratified them by a very marked increase in the business which the regular schedule has brought about.

UNION TICKET AND INFORMATION COMPANY.

The office of the superintendent of interisland transportation has been moved into the Union Ticket and Information Office, situated in the building previously known as the "Office of the Captain of the Port." Here are combined ticket offices for most steamship lines, cab stands, telephone office, and room for visiting captains. There are waiting rooms for men and for ladies, and this building, it is believed, will fill a long-felt want for the further development of the port of Manila. It is hoped that this company will take more commodious quarters and have a division for the care and encouragement of tourists, with a room for custom-house officials, where the baggage of first-class passengers can be examined. At present it is not clear exactly where the new site should be, whether on the south bank of the Pasig River or on the filled-in land contiguous to the proposed new hotel.

DIVISION OF VESSELS.

As compared with the preceding year, seagoing vessels visited during the year 4,370 ports, a decrease of 869; carried 14,915 passengers, a decrease of 7,364, and 6,976 tons of freight, a decrease of 171 tons; and steamed 290,000 miles, a decrease of 100,555 miles.

During the year ₱235 in fines were charged against contract steamers.

LIGHT-HOUSE DIVISION.

At the beginning of the fiscal year 1907 there were 105 lights; at the close 117, an increase of 12 lights during the year. These lights may be grouped as follows:

Flashing lights	28
Occulting lights	9
Fixed lights	3
Port lights	28
Lens lanterns	47
Electric arc lights	2
Total	117

There are now in place 109 buoys and beacons.

It is believed that the navigated coast line of the Philippine Islands is now reasonably well lighted.

DIVISION OF PORT WORKS.

The Luneta Extension was completed June 3, 1907, and will shortly be turned over to the city of Manila for maintenance. The contract for the extension of the east breakwater was completed May 17, 1907.

The construction of new wharves has been slowly progressing. The original plans did not provide for abutments, and the plans sug-

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gested involved the construction of an expensive new sea wall, calling for a sum of money not readily available from the insular treasury. The then director of port works was asked to prepare plans for abutments only, leaving the sea wall for later development, and he proposed as an economical measure abutments similar to those which were put in use for the wharf recently completed for the Army, and which at that time were giving good satisfaction, but which since have settled considerably. The contract for the two abutments for the new Manila wharves, at a cost of ₱15,000, was let January 12, 1907. On May 13, 1907, after ₱3,492 of the money appropriated had been expended, the concrete wall for the first of these abutments settled and proved that the plan was not satisfactory; wherefore the contracts were canceled. The then chief of the division of port works prepared plans for new abutments at a cost of ₱375,000, but this department was not satisfied with the necessity for the magnitude of this increase and a committee of expert engineers was convened, who, after consultation with the contractors and the director of navigation, prepared new plans for abutments, for which contracts amounting to ₱113,041.54 were let on the 22d day of October, 1907.

Wharf "B" should be completed and ready for use in March and wharf "A" in August, 1908.

IMPROVEMENT OF THE PORT OF CEBU.

The improvement of the port of Cebu has been progressing slowly, the contractors not being able to complete their work on time.

IMPROVEMENT OF THE PORT OF ILOILO.

The port of Iloilo has been completed.

During the year 6 ports were surveyed, and preliminary examinations of 20 other ports made. Since June 30, 1907, 5 ports have been surveyed.

PHILIPPINE COAL SUPPLY.

During the year the coast-guard cutters plying in the neighborhood of Albay have purchased their coal in Batan. It is necessary to change the grate in these steamers in order to make economical use of this coal, but the result has been uniformly satisfactory and a very great saving has been made.

For further information and details attention is invited to the report of the director of navigation, attached hereto and marked "Appendix F."

BUREAU OF COAST SURVEYS.

At the beginning of the fiscal year it is estimated that 1,645 statute miles, or 2,647.4 kilometers, of the general total of 11,511 statute miles, or 18,525 kilometers, the equivalent of 14.3 per cent of the coast line of the islands had been surveyed for charting. During the year 828 statute miles were completed, as against 358 statute miles for 1905 and 431 statute miles for 1906, making a total at the close of the fiscal year, exclusive of Spanish and British work, of 2,474 statute miles, or 3,983 kilometers, the equivalent, in other words, of 21.5 per cent of the total general coast line of the Philippine Islands.

The cost of the work for the past three years has been ₱380,850 for 1905, ₱518,054 for 1906, and ₱544,762 for 1907, or ₱892.80 per mile of coast line completed.

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The director of coast surveys explains part of the increase in survey for the past year by the fact that a considerable portion of the coast line surveyed lay in deep water, where the absence of obstructions made it unnecessary to run the lines so close as would be the case where the water is shallow and obstructions appear near the surface.

The director reports good progress in the preparation and issue of charts, for the detail of which attention is called to his report.

CENTRAL GEOGRAPHICAL OFFICE.

At the close of the fiscal year 1907 the Secretary of the Interior called the attention of the officers of the various bureaus to the fact that no systematic compilation was made of the surveys and material gathered by the different bureaus, and thus available knowledge acquired by the army and naval authorities and the different bureaus was not being compiled in such a way as to make it useful and available for other bureaus and departments, whether of insular or United States surveys, and for the compilation of correct maps. The Commission took appropriate action and have provided that an office be established in the bureau of coast surveys which should be the official recipient of all information gathered by all bureaus in regard to the geography of the islands. This new division of the coast survey is now under organization and should remedy the defect.

For further information and details attention is invited to the report of the bureau of coast surveys, hereto attached and marked "Appendix G."

CORPORATIONS.

The corporation law (act No. 1459), which took effect April 1, 1906, provides (in sections 68 to 73) that all foreign corporations shall be licensed by the chief of the division of archives, patents, copyrights, and trade-marks, and that the order for such license in case of all corporations other than banking ones shall be issued by the secretary of commerce and police if satisfied of the solvency and fair dealing of the applying corporation. As originally drawn the act gave foreign corporations until September 1, 1906, to secure this license, but subsequent amendments extended the time to August 1, 1907.

Under this authority orders for licenses for 167 corporations were issued up to August 1, 1907. Of these, 83 are British corporations, 37 American, 19 German, 6 Spanish, and 22 miscellaneous.

One application for a license (the Philippine Plantation Company, a corporation organized in the Territory of Arizona) was held, owing to indications from the documents and papers issued by the company, and from other sources, of a lack of fair dealing with the public, whereupon the application was withdrawn by the agent of the corporation in Manila.

Respectfully submitted.

W. CAMERON FORBES,
Secretary of Commerce and Police.

To the PHILIPPINE COMMISSION,
Manila, P. I.

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APPENDIX A.

REPORT OF DIRECTOR OF CONSTABULARY.

BUREAU OF CONSTABULARY,
Manila, P. I., July 1, 1907.

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1907.

The province of Samar was changed from the third to the second district during the year for the purpose of equalization, and the constabulary of Romblon, second district, was attached to Capiz, in the third district, when Romblon was made a subprovince of Capiz.

Brig. Gen. Henry T. Allen was present as director until his departure for the United States, May 15, 1907, whereupon the undersigned performed the duties of acting director to June 30, when he was appointed director.

Col. W. S. Scott (Capt., First U. S. Cavalry) and Col. D. J. Baker, jr. (Capt., Twenty-sixth U. S. Infantry), were relieved from duty with the constabulary October 26, 1906. Capt. W. C. Rivers, First U. S. Cavalry, and Capt. M. L. Hersey, Ninth U. S. Infantry, inspectors for constabulary, were appointed colonels and assistant directors of constabulary October 26 and 27, 1906, respectively. Capt. J. B. Bennet, Sixteenth U. S. Infantry, was detailed January 3, 1907, as inspector for constabulary per authority of cablegram dated War Department, December 27, 1906. First Lieut. Louis J. Van Schaick, Fourth U. S. Infantry, was detailed as inspector for constabulary February 15, 1907, per authority of cablegram dated War Department, December 10, 1906.

The enlisted strength of the constabulary, including the medical division and the constabulary band, consisted, on June 30, 1907, of 4,781 men, distributed at 167 stations throughout the archipelago. There have been no scout companies on duty under the civil government during the year, although in Samar and Leyte they as well as regular troops have acted in conjunction with the constabulary in field operations against the hostile pulahanes. All such operations were characterized by the most harmonious relations between the constabulary and the United States troops.

PEACE CONDITIONS.

FIRST DISTRICT.

Conditions in this district are good at present and are steadily improving. The Salvadoristas, the fanatical members of the so-called Santa Iglesia, under the leadership of Felipe Salvador, are still in existence, but have broken up into a number of small, poorly organized bands, among whom there are scattered about 35 guns. This organization has many passive followers and sympathizers throughout the northern provinces of the district, and especially in Nueva Ecija, Tarlac, Pampanga, and southeastern Pangasinan. Salvador has no fixed abode and is constantly in motion; he commits no abuses, and the result is that very little information can be had concerning him from the people of the above localities. Since August, last year, these fanatics have given practically no trouble. In October, 1906, they made an attempt to gain a foothold in Bataan Province, but were unsuccessful. The constabulary encountered an armed band of these outlaws in that month, which resulted in the death of the leader, Nicolas Santiago, and 2 others, the capture or surrender of 4 men, and the seizing of 14 guns and 1 revolver.

"President" Macario Sakay, of the so-called Filipino Republic, "vice-president, secretary of war, and lieutenant-general" Francisco Carreon, "Lieut. Gen." Julian Montalon, and "Brig. Gens." Leon Villafuerte, Lucio de Vega,

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and Benito Natividad were placed in jail July 18, 1906, after having unconditionally surrendered one or two at a time. These leaders had for years disturbed the provinces immediately around Manila, and were the nucleus of the outlawry in that section. They were tried by the court of first instance, and on September 28, 1906, Sakay, Montalon, Villafuerte, and Natividad were sentenced to death. They appealed to the supreme court, which had not rendered decision at the date of this report. Carreon was tried separately, and on December 6, 1906, was sentenced to imprisonment for life; he did not appeal therefrom. The conviction of these bandits contributed materially to the peace of the district they had infested.

On April 12, 1907, one Modesto Miaco, constabulary soldier, deserted and stole 9 carbines with the accompanying belts and ammunition from the constabulary cuartel at Balanga, Bataan, gave these to prisoners confined in the provincial jail, who thereupon killed the sentry over them, 10 of the prisoners making their escape. The band, accompanied by Miaco, was pursued by a detachment of constabulary under Lieutenant Bates, who, on April 23, at Talian, Mariveles, succeeded in killing one of the escaped prisoners. The leader of the band, Alfonso Diaz, was killed April 25 near Cabcabin. There are still at large 5 members of this band, including Miaco, whose present whereabouts is unknown, but is supposed to be in the mountains of Porac, Pampanga. Their operations are confined mostly to the provinces of Bulacan and Pampanga.

In Batangas and Cavite provinces, the remnant of Montalon's band, Pablo de Castro, with 5 rifles, is still at large. On May 13, 1907, Corporal Luna with 5 soldiers fought this band of 8 armed ladrones, killing 1. People at Talisay, Tanauan, and Cabuyao, are lending assistance, and the early apprehension of these criminals is expected.

In Cavite, one of Lucio de Vega's followers, Domingo Lumucso, was still in the field with 5 robbers and 2 guns on June 30. This band has since been captured. There are no ladrone leaders at present in Cavite. In February of the present year, the right of franchise was restored and peace conditions there are now excellent.

In Laguna Province there is a small band of about 4 bandits still at large. The leader, Fulgencio de Guia, was recently captured, however, and this feeble organization is now without a head.

The Province of Nueva Ecija is in an unsettled and unsatisfactory conditon. Salvador maintains a considerable prestige among the ignorant masses, who are extremely indifferent to the efforts of the authorities in maintaining law and order. There are many vagrants, and petty crimes are of frequent occurrence, while gambling is prevalent throughout the province. The municipal police, as a rule, are generally indifferent. A raid on the town of San Juan de Guimba by an armed band of 13 ladrones in May, 1907, was the only active aggression by an organization during the year. There have been no religious disturbances in the district.

SECOND DISTRICT.

So far as any aggressive outlawry is concerned, this district is generally quiet. There is no criminal organization known to exist in the Provinces of Romblon, Mindoro, or Sorsogon, nor are there any unauthorized arms known to be in the possession of the people.

In Ambos Camarines, a small band, consisting of 12 men under the leadership of Valerio Avila and Nemesio Vargas, has been committing depredations recently near the borders of Tayabas Province. A constabulary force is now operating against them.

In Tayabas Province, a religious-military organization, the "Ejercito Libertador Nacional" so called, was broken up by Governor Quezon and the constabulary near Atimonan and Unisan. Nineteen of its officers surrendered or were captured, and are now awaiting trial by the courts.

Pantaleon Villafuerte, a bandit leader who had long operated around Casiguran, Tayabas, was killed, and his band with 5 rifles and a revolver were captured in July, 1906, through the personal efforts of Governor Quezon. They had robbed the treasurer of Palanan a short time before the capture. The money was recovered. The killing of Villafuerte following so promptly upon this raid put an end to ladronism in that section of Tayabas.

Operations in Samar have been continued by the military, constabulary, and volunteer forces throughout the year. Many prominent leaders, including

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Cipriano Amongo, alias Tiducduc, Pedro de la Peña, Aguilar, and Atibadoy, have surrendered or been captured from time to time, so that to-day the only remnants of Pulahanism in this island consist of Otoy, Simon Angeles, and Ubaldo Diaz, with several small bands, none of which have been aggressive for many months.

The following, from Colonel Harbord's report, appears to outline the policy to be pursued in this island:

"There have been no aggressions by pulahanes in 1907, and they no longer stand to fight. It is a tedious man hunt by small parties traveling light and, as stated above, may last for years or might be terminated in half an hour by a lucky encounter. The work is one for which the constabulary is particularly suited. It is not, in my opinion, work to which the scouts with their present ideas of impedimenta, necessity for cargadores, etc., are fitted, notwithstanding the great individual enterprise and energy of many of their officers. Both scouts and constabulary, in my judgment, are working together, sincerely sharing, as far as is known, all information obtained by either, and that harmonious cooperation has, with slight exception, prevailed throughout the year. It is so well known that the army has done its work in Samar efficiently and well, and so much of the pacified condition there is due to its tireless scouting, that it needs no reiteration of these facts from the undersigned. They are appreciated by no one more than the constabulary, high and low. The work, however, has now reached that heart-breaking stage of tedious, fruitless marching to and fro on 'noticias,' which does not add to military efficiency, holds no allurements for the military man, and is not a military but a police problem. The burden of furnishing cargadores for marching columns lies heavily on the law-abiding people of Samar and is a serious obstruction to the resumption of ordinary occupations of peace. It is the best judgment of the undersigned that the public interests would be served if the military on Samar were now returned to their ordinary status, their operations to cease, except for practice marches showing the uniform occasionally for moral effect in such portions of the island as may be requested by the provincial governor and can be conveniently granted by the department commander."

THIRD DISTRICT.

Conditions in Cebu appear to be better now than they have been at any time since American occupation. The ladrone band headed by Quintin Tabal and his brother, Anatalio, has been constantly pursued by the constabulary, and with the inauguration of Don Sergio Osmeña as governor the outlaw element found the insular and provincial authorities thoroughly united and determined to clean up the province, and the surrender of these leaders to the governor soon followed. Governor Osmeña has been untiring in his efforts for peace and order and, with the assistance of the constabulary, has succeeded in clearing this province of all professional leaders, among whom may be mentioned Petronillo Esnardo and Ruperto Caballero in the north and Agustin Pardines in south Cebu.

In Iloilo, peace conditions are not deemed satisfactory. Three important outlaw bands are at large, having all told about about 30 firearms in their possession. These with 5 minor bands, supposed to be under their influence, more or less, live in the mountains or foothills, making occasional raids in the lowlands for the purpose of robbing small villages or stealing carabao.

Leyte.—The principal disturbances in the third district the past year have taken place in Leyte. Beginning with the outbreak in June, 1906, at Burauen, aggressions of pulahanes under the active leadership of Faustino Ablen have continued throughout the year, and were brought to a successful conclusion on the part of the authorities only in June last. Since July 24, 1906, on which date Major Nevill, in command of the constabulary forces, and Captain McMasters, Twenty-fourth U. S. Infantry, with a detachment of his company, had an encounter with pulahanes at Tabon-tabon (which was included in the report of the director of constabulary for 1906), the following encounters have taken place in this campaign against the pulahanes by the military, constabulary, and volunteer forces:

On August 9, a column of Regulars under Lieutenant James, Eighth U. S. Infantry, was attacked at Julita. Lieutenant James, Doctor Snyder, Revenue Agent Williams, and several soldiers were killed. September 10, Lieutenant Treadwell, Philippine Scouts, was killed by pulahanes in an attack made upon his camp. December 5, Captain Ham, U. S. Army, with Company L, Eighth

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U. S. Infantry, and Lieutenant Yates with 25 constabulary, were attacked near La Paz by a strong body of pulahanes led by Basilio Samson, resulting in the death of Samson, 40 pulahanes, and 5 American soldiers, and the loss of 3 rifles. Lieutenant Yates, Philippines Constabulary, was severely wounded in this fight. The pulahanes withdrew to the mountains, where they remained with many others in hiding until January 6, 1907, when Captain Chrisman, Sixteenth U. S. Infantry, and Lieutenant Hemmett, Philippines Constabulary, with a force of Regular soldiers, constabulary, and volunteers from Dagami, attacked their stronghold. Lieutenant Hemmett was wounded in this fight. From that date there were no more encounters until Lieutenant Snodgrass of the constabulary, with a small detachment and 2 American soldiers, came upon a pulahan camp near Guinarona. The pulahanes immediately dispersed without casualty. Lieutenant Snodgrass was wounded. Following this engagement, pulahanes were rapidly picked up by troops or volunteers or surrendered with many rifles. On June 11, a detachment of Regular soldiers and scouts under Lieutenant Jones, Eighth U. S. Infantry, wounded and captured one of 4 pulahanes, who was afterwards found to be Faustino Ablen, commonly known as "Papa" or "Pope" Faustino, the acknowledged leader of the pulahan movement. His capture ended the campaign. Felipe Idos, with little or no following, is the only leader still at large in the island.

Referring to the civil volunteers, Colonel Rivers, the district director, states:

"Much should be made of the assistance of the people of Leyte themselves in the capture of Faustino and his band. While no doubt their efforts were often without results and ineffective, the people of the towns of Burauen, Dagami, and Tanauan on the east coast, and of Ormoc, Albuera and Baybay on the west coast, turned out sometimes by hundreds and sometimes with a number of four or five thousand in all as volunteers. * * * Many of them went to the mountains on expeditions for a number of days, suffering hardships due to constant rains and to the roughness of trails. The efforts of the provincial and municipal officials were of great assistance to the authorities and were cheerfully given."

This uprising in Leyte embraced only the minority of the people of the central part of the island and included at most only 8 of the 34 municipalities. This outbreak had no connection with the pulahan movement in Samar.

In the island of Negros there exists the remnants of an organization formerly known as Babaylanes, who were fanatical in the sense that in their ignorance and superstition they believed in the efficacy of the anting-anting, and their leader styled himself Pope or "Papa" and claimed to have divine power.

Their present leader, Dionisio Magbuela, commonly known as Papa Isio, is an old man about 65 years of age, a native of Antique, but has lived in Negros since his boyhood. In 1880, he was employed as a herder near Isabela, Negros, and having in a quarrel wounded a Spaniard, fled to the mountains to escape justice.

The Babaylanes had just previously lost their leader and Isio announced himself as pope and was accepted by them. For a number of years his followers were numerous and his influence great. He assisted the insurgents in the overthrow of Spanish authority in 1898 and himself and followers were known as insurgents. He was appointed military chief of La Castellana, Negros Occidental. This increased his power and influence to such an extent that the educated class fearing his power asked in 1899 for American occupation. Isio and his followers began a campaign of murder and arson. Since 1900, he has confined himself to the mountainous country of Negros Occidental and Oriental, but has descended once each year to attack some unprotected part of the province. His following has gradually decreased, until at the present time it consists of perhaps a dozen "remontados" and as many more montescos. His subchiefs are Juan Mayo, Marcelo Tuyo, Eugenio Talatala, and Eugenio Alcachufas. The first two are natives of Antique. Talatala is a native of Himamaylan and was formerly a member of the Guardia Civil. Eugenio Alcachufas is a native of Cebu, and is said to have commanded the pulahanes who attacked and killed Lieutenant Walker, Philippines Constabulary, in Cebu in 1903. They have 5 rifles and 1 revolver.

Living as they do in the mountainous portion of the island, numberless expeditions have been sent against him without effecting his capture. He formerly exerted great influence over the ignorant mountain people known as montescos and subsisted himself and men by levying on them. On February 12

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of this year he sent his band to the lowlands, where they burned Suay, a barrio of Himamaylan, and the following morning attacked and defeated a small detachment of constabulary at Cabancalan and burned the barrio. This was an attempt on the part of Isio to start a general uprising. He did add some montescos to his following. He was attacked by Capt. George B. Bowers and Lieut. E. W. Stoll in his mountain camp at Cunalum on April 12. They killed 1 man and captured a serviceable rifle. Several hundred montescos, formerly followers or believers in Isio, have surrendered and pledged themselves to assist us in his capture. Without their assistance, it is considered impracticable.

FOURTH DISTRICT.

No organized bands have been in operation during the time covered by this report. One attempt was made in Ilocos Norte to organize such a band which was quickly squelched. Constabulary have been used principally in the suppression of crime against persons, breaking up of cattle stealing, frustrating raids by non-Christians in isolated localities, encouraging friendly relations between non-Christian tribes, and in affording protection to the peaceful inhabitants.

FIFTH DISTRICT.

The following are the principal engagements which have taken place in the Lanao district: On June 4, Lieutenant Furlong with Lieutenant Tarbell and 60 constabulary inflicted severe punishment in a hand to hand fight against a number of followers of Mural Hakim at their cotta in the Toroco Valley. With the exception of Lanao, the peace conditions in the fifth district have been generally good. Constabulary forces have been used in many ways, not only in the field, but in performing numerous civil duties of trust and importance. The policy of the civil government in the Moro Province has been to foster the first principles of government, by gaining the confidence of the headmen, by meting out justice and by increasing trade among the Moros by peaceable rather than forcible measures. By these means and occasional demonstrations the despotic power formerly held by sultans and other chiefs has been considerably curtailed.

In the Cotabato district, two minor engagements with outlaws under Sultan sa-Dimabara resulted in the killing of 8 outlaws.

Although no actual demonstration has been made against the government by outlaws in the Buldoon region, a bad element has existed there, entailing considerable work on the part of the constabulary.

CHIEF SUPPLY OFFICER.

Attention is invited to the complete report of the chief supply officer as to the methods and workings of this most important department of the constabulary.

During the year the enlisted personnel has been partially armed with the Krag carbine, modified by the addition of the rifle bayonet—a most important change.

Provided with a magazine arm of great range and accuracy, with smokeless powder ammunition, and equipped with a bayonet, every soldier so supplied naturally feels superior now to any antagonist he may meet. He no longer must depend on firing one shot and then clubbing his gun in the almost inevitable bolo rush.[a]

The following general remarks from the chief supply officer's report indicate results of the system of retrenchment practiced throughout the service the past year:

"There was actually appropriated for the bureau of constabulary for the fiscal year 1906 ₱3,744,121.36. Besides this the bureau of navigation gave us free transportation, costing ₱150,000, so that in reality there was appropriated for the bureau of constabulary for the fiscal year 1906 ₱3,894,121.36. For the

[a] Lists showing the result of operations, arms captured, outlaws killed and captured, and constabulary casualties, have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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fiscal year 1907 there was appropriated ₱3,151,800. Out of this we have paid all of our obligations to the bureau of navigation; have in part rearmed the constabulary, and have on hand funds available to complete this rearmament; we have also paid ₱79,000 for shoes that we expected at the time of the last annual appropriation to sell to the army, and had on hand at the end of the fiscal year funds sufficient to meet all outstanding obligations.

"This reduction of ₱742,321.36 from the expenditures for the previous year was obtained by reducing the stock of clothing and other supplies on hand in our bodegas in this city by a slight reduction in the enlisted strength, and, above all, by careful pruning of the small expenditures in all of our 200 or more stations. These economies, while seemingly small in each case, were large in the aggregate.

"Our total refunds for services and supplies to the insular treasury for the fiscal year 1907 amounted to ₱85,947.96."

MUNICIPAL POLICE.

The municipal police organized in the various municipalities throughout the archipelago consists of 18 captains, 96 lieutenants, 356 sergeants 654 corporals, 4,630 privates; total, 5,754.

The several district directors report their efficiency in one province as very good, 12 good, 2 fairly good, 15 fair, and 9 poor. From no province is their efficiency rated excellent.

In some municipalities municipal police are paid as little as ₱4.50, ₱5, ₱6, and ₱7 per month. Whenever police are underpaid to this extent one of two things is true—either the man appointed to the police force has some other business to which he devotes his time and accepts his police salary as a kind of gratuity from the presidente, or he uses his official position to augment his income illegitimately. Appointment of police has become in some municipalities to be considered as a perquisite of the office of the presidente.

Section No. 26, act No. 82, makes the police go out of office with the presidente, and thus they are changed with each new municipal administration, which operates against their efficiency. They are still used in many places as servants for the presidente rather than as police. The director of the second district knows of one case where on a visit to a town the chief of police was a cook in the house where the governor was entertained. In most towns in the United States a town marshal and a night watchman take care of cities the size of towns here that are now equipped with from 12 to 20 police.

OFFICERS.

The number of officers authorized is barely sufficient to meet the demands upon the service if all were present for duty. Vacancies due to separations, officers ill and on leave, and occasional ones detached for important service with other bureaus, all tend to keep the active force below what is deemed necessary for the proper performance of all duties.

The quality of new appointments to the service is growing better. The young men secured from American colleges, while yet lacking in the experience so necessary to their complete equipment, are giving evidences of industry and sincerity that promise well for the future.

The preliminary instruction given at the school to new appointees, covering their civic and military duties and their relations to the people, has been productive of much good. These officers now enter upon their duties better prepared therefor to the manifest advantage of the government. At the close of the fiscal year Capt. J. B. Bennet, Sixteenth U. S. Infantry, inspecting officer, was relieved as superintendent of the school by Capt. Charles J. Kindler, of the constabulary.

Since the last report 39 officers have resigned, 3 died, and 10 were dismissed for cause.[a]

Very respectfully,

H. H. BANDHOLTZ,
Director.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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[a] Tables showing constabulary strength and station list have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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LIST OF TOWNS OCCUPIED JUNE 30, 1907.

Manila	Constabulary school and casuals at constabulary barracks, Calle Santa Lucia, Intramuros.
Albay	Albay, Ligao, and Tabaco.
Ambos Camarines	Nueva Caceres, Goa, and Daet.
Antique	San Jose, San Remigio, Valderrama, and Culasi.
Bataan	Balanga.
Batangas	Lipa, Talisay, Tranca, Paliparan, Santa Clara, and Tanauan.
Benguet	Baguio, Loo, and Paoay.
Bulacan	Malolos and Baliuag.
Cagayan	Tuguegarao, Appari, Abulug, and Mauanan.
Capiz	Capiz, Tapaz, and Balasan.
Cavite	Cavite, San Francisco de Malabon, Ulat, Alfonso, Silang, Paliparan, and Amadeo.
Cebu	Cebu, Camp Seno, Danao, and Naga.
Cotabato	Cotabato.
Davao	Davao, Mati, and Boston.
Ilocos Norte	Laoag, Dingras, Santa Matilde, Bangui, and Badoc.
Ilocos Sur	Vigan, Santa Catalina, Candon, Villavieja, San Jose, Bangued, San Juan, and Sapid.
Iloilo	Iloilo, Jaro, Camp Sisson, Leon, Alimodian, Maasin, Janiuay, Acao, San Rafael, and Lemery.
Isabela	Ilagan, Echague, San Isidro, and Mayayao.
La Laguna	Santa Cruz, Calamba, Santa Rosa, Alaminos, Stranglupa, Santo Domingo, Caluang, and San Ildefonso.
Lanao	Marahui, Iligan, and Dansalan.
La Union	San Fernando, Rosario, and Aliem.
Lepanto Bontoc	Cervantes, Bontoc, Lubuagan, and Balbalasan.
Leyte	Tacloban, La Paz, Abuyog, Camp Worswick, Dolores, and Burauen.
Misamis	Cagayan and Misamis.
Mindoro	Naujan.
Nueva Ecija	San Isidro, Cabanatuan, San Jose, and Aliaga.
Nueva Vizcaya	Bayombong, Payauan, Banaue, Quiangan, and Aritao.
Negros Occidental	Bacolod, Camp Barrett, La Castellana, Isabela, Cabancalan, Guimbalaon, Magallon, Himamaylan, and Binalbagan.
Negros Oriental	Dumaguete and Guijulngan.
Pampanga	San Fernando, Arayat, and Floridablanca.
Pangasinan	Dagupan, Tayug, Alaminos, and Rosales.
Palawan	Cuyo, Coron, and Balabac.
Rizal	Pasig, Malabon, Montalbon, Novaliches, Tanay, Zapote, and Muntinlupa.
Romblon	Romblon.
Samar	Catbalogan, Calbiga, San Jose, Concord, Biri, and San Julien.
Sorsogon	Sorsogon and Masbate.
Sulu	Siasi, Bongao, and Sitanki.
Surigao	Surigao, Talacogan, and Butuan.
Tarlac	Tarlac, Paniqui, and Concepcion.
Tayabas	Lucena, Lucban, Calauag, Tiaong, Unisan, and Agdangan.
Zambales	Iba and Santa Cruz.
Zamboanga	Zamboanga, Dapitan, Dipolog, Calarian Prison, San Ramon, and Tacuran.

REPORT OF DISTRICT DIRECTOR, FIRST DISTRICT.

FIRST CONSTABULARY DISTRICT, OFFICE OF DISTRICT DIRECTOR.

MANILA, P. I., *July 26, 1907.*

SIR: I have the honor to submit the following report of operations and conditions in the first constabulary district for the fiscal year ended June 30, 1907.

The district comprises the provinces of Bataan, Batangas, Benguet, Bulacan, Cavite, La Laguna, Nueva Ecija, Nueva Viscaya, Pampanga, Pangasinan, Rizal, Tarlac, and Zambales, the same as on the date of the last annual report.

There have been 4 district directors or acting district directors during the year, as follows:

Col. H. H. Bandholtz, Philippines constabulary, from July 1, 1906, to April 19, 1907.

Lieut. L. T. Van Schaick, U. S. Army, from April 20, 1907, to May 16, 1907.

Col. Mark L. Hersey, Philippines constabulary, from May 17, 1907, to June 7, 1907.

Capt. Herman Hall, U. S. Army, from June 8, 1907, to June 30, 1907.

The strength of the constabulary for the district on the date of the last annual report was 67 officers and 1,384 enlisted men. Present strength, June 30, 1907, 66 officers and 1,405 enlisted men, included in 33 organizations. A reduction is hardly advisable at present, though during the year the enlisted strength may be somewhat reduced. I am in favor of a larger proportion of officers to enlisted men as conditions improve, for it is from the officers we get the best

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service, and it often happens that one good careful officer in a province is of more value than a detachment of men.

Rents on June 30, 1906, were ₱2,370.78 per month, and at present date, June 30, 1907, are ₱1,576.83 per month. As permanent buildings are constructed the rents can be further reduced.

PRESENT PEACE CONDITIONS.

Conditions as to law and order throughout the district are good and steadily improving. No large organized ladrone bands are at large. The Salvadoristas, or followers of Santa Iglesia, have with their armed bands about 35 guns. The passive followers of Salvador are very numerous, especially in Nueva Ecija, Tarlac, and southeastern Pangasinan. It seems impossible to obtain information about Salvador's location, or that of his armed followers; his people will not tell, as he apparently treats them well, and he will not present himself. When his bands appear they have been continually pressed until they fade away.

RELIGION AND POLITICS.

The Independent Catholic Church, known as the Aglipay faction, is about on the same status as last year, possibly less important. Followers are mostly in Tarlac and Pangasinan. There have been no serious disturbances during the past year occasioned by differences in religious feeling.

The Calorum sect has some followers in Batangas, Cavite, and Tayabas, but they are harmless.

OUTLAWS AT LARGE.

There are not many, and excepting Salvadoristas there are no large organized bands.

Modesto Miaco has possibly 13 guns; his operations are confined mostly to the provinces of Bulacan and Pampanga, and possibly Tarlac and Nueva Ecija. He is now supposed to be in the mountains of Porac, Pampanga.

Felipe Salvador's armed bands control about 35 guns, which seem to be scattered, and during the latter part of the year have not been used in raids or robberies.

In Batangas and La Laguna Provinces, Pablo de Castro, with 4 bandits and 5 rifles, remnants of Montalon's band, is still at large, but with the aid of the people of Talisay, Tauanan, and Cabuyao, their destruction is predicted.

In Benguet, at Benaltin, district of Kayupo, it is reported that there is a party with 10 rifles, captured some years ago from the Spaniards, but this has not been confirmed.

In Bulacan, Severino Rodriquez, alias "Berong," is supposed to be with Salvador in Pampanga or Nueva Ecija with 9 rifles and 3 revolvers.

In Cavite, Domingo Lumusco, one of Lucio de Vega's followers, is out with 5 robbers, and 2 guns, both unserviceable, and 1 revolver (since June 30, 1907, Lumusco has been captured).

In La Laguna Province is a small band known as the "Degui," headed by Fulgencio de Guia, with 3 followers and 3 revolvers.

In Nueva Ecija are some bands of Salvadoristas, having a total of about 35 guns, as mentioned above.

Pampanga is sometimes visited by Salvador's bands, but has no other organized ladrone party.

SPECIAL EVENTS.

The constabulary has been busy pursuing and capturing ladrones and carabao thieves, prosecuting, patrolling, and making arrests, but only important occurrences will be mentioned.

Bataan.—The Salvadoristas, or followers of Santa Iglesia, have a few followers in the northeastern part, but they are passive, and an effort made by certain leaders of the sect to gain a greater foothold in the province during June, July, and August, 1906, was unsuccessful. An armed band of these fanatics was encountered by the constabulary during August, 1906, resulting in the death of the leader, Nicolos Santiago, and 2 others. Two others were captured and 2 surrendered. Fourteen guns and 1 revolver captured.

During the night of April 12, 1907, a jail delivery took place at the provincial jail, through the connivance of one Modesto Miaco, a constabulary soldier.

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Miaco took 9 carbines, 8 belts, and 320 rounds of ammunition from the cuartel and armed the prisoners through the window of the jail. The prisoners killed the sentry, and 10 of them made their escape. Miaco and the prisoners robbed a tienda at Bagac the following night after their escape. They met with little sympathy among the people. One of their number was killed by an expedition under Lieutenant Bates at Talian, Mariveles, on April 23. Their principal leader, Alfonso Diaz, was killed near Cabcabin by Pedro Pandiño on April 25. One member having deserted them, and 3 others having surrendered, the 5 remaining ones seem to have left the province for good.

Bulacan.—Only minor thefts and a limited number of crimes are of record.

La Laguna.—In Laguna Province, May 13, 1907, Corporal Luna with 5 soldiers fought 8 armed ladrones under De Castro, and killed 1—1 soldier killed and 1 wounded.

Nueva Ecija.—May 13, 1907, about 13 ladrones, armed with 3 revolvers, raided the town of San Jose de Guimba, forcing the treasurer to open the municipal safe, which they looted, carrying away about ₱4,779.13. No resistance was offered by the police, who were, however, unarmed—there were 5 at the municipal building at the time. This robbery may have been a conspiracy on the part of certain municipal officials and the ladrones.

The province of Nueva Ecija is in an unsatisfactory condition, largely through ignorance of the masses; the people are indifferent and render very little aid in assisting the government in maintaining law and order. Thieving and robberies are frequent; gambling is prevalent, vagrants numerous, and policemen generally indifferent. Salvador has a strong hold on the people and this blocks advancement. Without reflecting upon the present senior inspector, it has been decided to send a new officer there, who may get better results. This province will be given special attention.

MUNICIPAL POLICE.

Steps have been taken to gradually reduce the number of rifles and shotguns held by them, and issue revolvers instead.

July 31, 1906, the police of the district had in their possession 808 rifles and 225 shotguns. June 30, 1907, the number is 705 rifles and 190 shotguns.

In some towns the police render good service and are well organized, but as a rule such is not the case. A revision of the law with regard to the organization of the municipal police is recommended, exempting them from the operations of section No. 26, act No. 82, and making the removal for "cause" more genuine.

If a board, to consist of the president of the municipality, the justice of the peace, and the senior inspector, could make all appointments and removals, a more efficient force could be maintained.

Municipalities spend so much money on their police that it is unfortunate the people do not get better returns. As a rule it would be advisable to reduce the forces in number and increase the salaries, for good men can not be obtained for the usual present salaries. However, a good police force is generally found with an efficient presidente.

CONSTABULARY.

Arms, equipment, uniform, and subsistence are quite satisfactory.

MEDICAL ORGANIZATION.

It is recommended that as a rule 1 hospital corps man be assigned to each company, provided well-instructed men can be obtained. The constabulary medical division is rendering good service.

BUILDINGS.

While satisfactory, it is recommended that the scheme for construction of permanent buildings be extended throughout the district.

TRANSPORTATION.

Satisfactory, though more serviceable riding ponies are needed to replace some that have become unserviceable.

I am not in favor of substituting American or Australian horses for native ponies; the latter are less expensive, stand the climate better, and are more adapted to getting about in this country.

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Senior inspectors are almost unanimous in recommending revision of the law governing thefts of animals and I heartily concur in this. The following suggestions are submitted:

Make it a more serious offense to have stolen animals in one's possession and there will be a fewer number purchased.

Make it a more serious crime for the stealthy unarmed thief who appropriates an animal.

The senior inspector of Benguet claims that during the summer season he has not enough men to furnish the various details, guides, etc., and requests a company of 65 men during this season.

Retrenchment has been practiced throughout the year, and economy will be enforced so far as possible with efficient service.

As time goes on the constabulary is becoming more and more servants of the people and guardians of the rights of the masses; abuses are not tolerated and are gradually being eliminated.

It is recommended that a law be framed authorizing constabulary officers, or army officers on duty with the constabulary, to administer oaths when making investigations, specially directed by the Governor-General. It is often difficult to promptly get the services of an official who possesses this power.

Herewith are accompanying tables showing work accomplished by the constabulary and municipal police, and other data with reference to the latter.[a]

Very respectfully,

HERMAN HALL,
District Director.

The EXECUTIVE INSPECTOR, PHILIPPINES CONSTABULARY,
Manila, P. I.

REPORT OF THE DISTRICT DIRECTOR, SECOND DISTRICT.

SECOND CONSTABULARY DISTRICT,
OFFICE OF DISTRICT DIRECTOR,
Albay, P. I., July 22, 1907.

SIR: The undersigned has the honor to submit the following report for the year ended June 30, 1907:

From July 1, 1906, to January 10, 1907, the district was commanded by Maj. Peter Borseth, assistant director, Philippine constabulary. Since January 10, this year, the command has been exercised by the undersigned with Major Borseth as assistant until May 1, when the latter was ordered from the district.

In March the headquarters of the second district were changed from Lucena to Albay, to the very great advantage of administration. April 1, the province of Samar was added to the district.

PRESENT PEACE CONDITIONS.

Generally, quiet prevails throughout the district. This is uniformly true as far as any aggressive outlawry is concerned. In Romblon, Mindoro, and Sorsogon Provinces, no organizations for crime are known to exist, and no arms are known to be in the possession of unauthorized parties.

In Tayabas Province, the leaders Marcelo Parafino and Esteban Deseo, of the "Ejercito Libertador Nacional," disorganized in April, and three unimportant followers, are still at large, but their prestige is gone. They have 1 revolver, but no ammunition.

In Ambos Camarines, operating near the Tayabas border, is a small band under Valerio Avila and Nemesio Vargas. The former gave much trouble in the Ragay region in 1904. Vargas was the real leader of a band belonging over on the Tayabas side near Calauag, whose active chief, Juan Kabayo, was killed by constabulary last December in North Camarines. Vargas in June joined Avila and between them they have 4 Remington rifles, 1 Mauser rifle, and 4

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[a] Tables showing the following have been omitted and are on file in the Bureau of Insular Affairs, War Department: Arms captured; animals captured; encounters; enlistments and desertions; outlaws killed and captured; work performed by municipal police.

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allurements for the military man, and is not a military but a police problem. The burden of furnishing cargadores for marching columns lies heavily on the law-abiding people of Samar, and is a serious obstruction to the resumption of the ordinary occupations of peace. It is the best judgment of the undersigned that the public interest would be served if the military on Samar were now returned to their ordinary status; their operations to cease, except for practice marches showing the uniform occasionally for moral effect in such portions of the island as may be requested by the provincial governor, and can be conveniently granted by the department commander.

MUNICIPAL POLICE.

The police of Samar are a fairly efficient body of men. Their number has during the year been decreased and the saving used to increase the pay of those who remain. They have taken part with constabulary and volunteers in several expeditions. During the whole year they have been directly under charge of a constabulary officer, First Lieut. W. A. Burbank, and lately under Lieut. Juan Suise, both of the constabulary of Samar. The method has been attempted of leaving the officer in charge in each town for some days, instead of hurrying through inspections. That necessitates an officer who can devote his time to nothing else. If officers could be had, it would work as well in any other province.

In Ambos Camarines single individuals on the police force of the several towns have been assembled for a month at a time at the capital for instruction. The senior inspector imparts drill and discipline, and the fiscal and others, some knowledge of the laws affecting them and their duties. This police has improved during the year. The same plan has been tried in other provinces, but has not succeeded, owing to several causes.

In other provinces of the district the efficiency of the municipal police remains about as it was last year—poor. In a way the efficiency of the police keeps pace with the intelligence of the other municipal officials. A good presidente has at least an obedient police. The undersigned realizes the possibilities in a fine municipal police force, but the outlook is very discouraging. The police afford patronage dear to the heart of the politician, and as they are generally managed in this district give a personal service to municipal officials, which has come to be looked on as a legitimate perquisite of office. They can only be made efficient where the governor is in thorough accord with the senior inspector and acts on his recommendations. Presidentes and sometimes governors are sensitive as to suggestions from the senior inspector, who is emasculated of any power over police except to inspect and report. If the power of appointment and removal were vested in the senior inspector, the efficiency of the municipal police would double in six months, and continue to improve. Under the present system they do not do their duty, and are generally messengers, muchachos, cooks, etc. The undersigned is much opposed to giving firearms to the police. Arms in the hands of police here lead to deplorable abuses, and none exist in this district, except in some towns of Samar, capable, in my opinion, of handling any situation desperate enough to require firearms. The possession of firearms by municipal police is the very basis of the "voluntary contributions" system—the worst form of oppression left by Spain in these islands. The district director should be given finality in deciding that municipalities in his district may not have arms—the question of whether they may have them, even when he is willing, being, as now, settled by superior authority.

Accurate records of work accomplished by municipal police are not obtainable. In some districts, small and compact, where travel is by land, inspections are made each month, but in others much more rarely. A compilation of such information as is available regarding municipal police is appended and marked "A."[a]

ARMS, EQUIPMENT, UNIFORM, AND SUBSISTENCE OF CONSTABULARY.

The arms will be satisfactory when all are armed with the remodeled Krag carbine. The Springfields are now worthless. The equipment is satisfactory. Some method of carrying the blanket in a roll held by thongs at the top of the

[a] This has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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haversack, the whole carried by straps around each shoulder, as native cargadores have carried their burdens for centuries, should be devised. The present large haversack dangling against the legs of a small soldier and swinging forward every time he stoops is unsightly and a burden. The uniform is satisfactory, except that woolen puttees should be substituted for leggings as soon as possible, as is understood to be the intention. The sample shoe of canvas with hemp sole soaked in tar, bellows tongue, slight heel stiffening, furnished for trial to the constabulary of Samar some months ago, was tried by the undersigned long ago in Mindanao and in every snipe-hunting season since, and is believed to be the very best field shoe we can obtain. Such, too, is the opinion of some army officers who have seen it in Samar.

MEDICAL ORGANIZATION.

Satisfactory in personnel but inadequate in numbers.

BUILDINGS.

The constabulary owns the barracks at Nueva Caceres. A new barracks has been erected and is soon to be occupied at Catbalogan. Temporary nipa barracks have been erected at Calbiga and Magtaon, and inherited at San Julian. Negotiations for a building and grounds in Sorsogon await only the pleasure of the court of land registration for their completion, and we shall then have there as good a constabulary location as there is in the district. During the year the province of Albay deeded to the insular government a site for a headquarters building for the district, and a building has been promised.

TRANSPORTATION.

Since March 1 the cutter *Negros* has been on duty in the district. Such a steamer is a necessity, and the inspections in a district with a thousand miles of Pacific coast line can not be made without one. That inspections must be made and that we must be prepared for emergencies is axiomatic, and the money spent for this cutter will be well spent. Naturally the bill for transportation grows larger in the constabulary as the force grows smaller, and the 4,500 men of to-day require proportionately more than the 7,500 of two years ago. Some animals have been added to the district, generally replacing those worn out in service. Each senior inspector is provided with a small boat of some kind. A launch is a necessity in Samar if peace is to be maintained with the 5 companies allowed that province. The province is willing to bear half the expense of hiring such a launch, and with the long coast line on the west, usually navigable for small launches, and the several large rivers, one would be constantly and effectively used.

DISTRICT BAND.

During the year 30 men have been detailed on special duty at these headquarters and have been instructed as a band. The effective strength of companies has been diminished correspondingly. The instruments have been bought by assessments on subsistence savings, it being understood that the band shall visit proportionally each province whose companies contribute, when such visits can be made without additional expense to the government. The experiment has been a decided success. The efficiency of a police is not measured by the number of arrests it makes, but by the creation and maintenance of good feeling among the people, making arrests unnecessary. Probably no 30 men in the district have done so much toward the creation of that good feeling as the district band. Certainly they have been far more useful than any corresponding number of men with carbines—and if necessary they can always resume the carbines. It is believed that this really important part of our work should be recognized by law and helped in the appropriations.

DIALECTS.

Special attention has been given by the undersigned this year to encouraging American officers to learn native dialects and to Filipino officers to learn English. The results are that in 1907 to date 11 officers have passed examinations.

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This district now has in it 13 qualified officers out of 27 in the entire constabulary who have so qualified. The examinations of 3 more are pending.

RECOMMENDATIONS.

Recommendations on special subjects have been given under the headings which have preceded this. On general subjects the undersigned can do no better than to renew recommendations made in his previous annual reports.

For tabulation of work accomplished during the year see Appendix "B."[a]

Respectfully submitted.

J. C. HARBORD,
District Director.

The EXECUTIVE INSPECTOR,
BUREAU OF CONSTABULARY,
Manila, P. I.

REPORT OF THE DISTRICT DIRECTOR, THIRD DISTRICT.

THIRD CONSTABULARY DISTRICT,
OFFICE OF DISTRICT DIRECTOR,
Iloilo, Panay, P. I., July 22, 1907.

SIR: I have the honor to submit the following annual report for the third constabulary district for the fiscal year ended June 30, 1907:

As Col. W. C. Taylor had charge of the district the greater part of the year—up to March 8 last—and as he was compelled to go suddenly to America on leave of absence without writing his report, this report will necessarily be incomplete. The undersigned succeeded Colonel Taylor in charge of the district on March 9. At the same time Capt. R. W. Jones was detailed as assistant director of the district. He has just been relieved, having been ordered to duty in the director's office in Manila.

TERRITORIAL EXTENT—POPULATION.

The provinces included in this district, with their population, are given in the table hereunder. They include more than one-third of the population of the archipelago, including 5 of the 6 most populous provinces in the islands.

Province.	Area.	Population.		Total.
		Civilized.	Wild tribes.	
Antique	1,134	131,245	2,921	134,166
Bohol	1,511	269,223	----------	269,223
Capiz	2,322	277,940	5,629	283,569
Cebu	1,939	653,727	----------	653,727
Iloilo	2,027	403,932	6,383	410,315
Leyte	3,008	388,922	----------	388,922
Negros Occidental	3,130	303,660	4,642	308,302
Negros Oriental	1,864	184,889	16,605	201,494
Total	16,935	2,613,508	36,180	2,649,718

During the year the Province of Samar was transferred, on March 31, to the second district, and recently the Province of Romblon has been added from the second district by reason of having been annexed to the Province of Capiz.

DISTRIBUTION OF THE CONSTABULARY.

The constabulary force allowed the district is distributed as shown below, the stations being omitted, as the appendix usually submitted with the director's report shows the stations and the number of men at each.

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[a] This has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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	Number of men.
General-service companies	135
Antique	80
Bohol	9
Capiz	105
Cebu	184
Iloilo	188
Leyte	141
Negros Occidental	141
Negros Oriental	47
Band	28
Total	1,058

The district is in need of officers, being much more short than some of the other districts, which fact has been reported to the director who will remedy the matter when practicable. The province of Leyte should have an additional company of 46 men for the southern portion. Otherwise the force seems sufficient for police purposes and is apparently distributed where most needed. Two of the three general-service companies are still in Leyte and one in Negros. One of the Cebu companies is still on detached service in Leyte. The number of men allowed this district two years ago was 1,900. The conditions have improved much in the past two years.

MILITARY GARRISONS—SCOUTS.

Within the limits of this district there are stationed 2 regiments of infantry distributed in 5 garrisons—2 on the island of Leyte, 1 in Cebu City, 1 in Iloilo City, 1 on Guimaras, Panay. Practically all of these companies were occupied at some time during the year in restoring order in Leyte. There are also 5 companies of scouts on duty in Leyte, 3 of which soon go for station, I am informed, to Samar. This will leave 3 companies of scouts within the limits of this district, there being 1 company stationed now at Balamban on the west coast of Cebu.

SPECIAL EVENTS—PEACE CONDITIONS.

Antique.—The Province of Antique has been very quiet during the year, and while it is a very poor province, the general trend of agriculture and conditions generally has been distinctly for the better. One of the companies of constabulary was absent many months in Leyte, where it did excellent service.

On March 30 the ladrone band of Santos from the high mountains in the center of Panay made an attack on the isolated barrio of Pangalcagan, burning a number of nipa houses and a quantity of rice and kidnaping 9 prisoners, 8 of whom they killed on the trail afterwards. The band was pursued by constabulary from another town and overtaken the following day, when a slight engagement took place, in which some of the ladrones were wounded, the band escaping, however, without much punishment, to the high mountains.

The people of Antique are, generally speaking, quite peaceable. The band of Santos is the principal disturbing factor. It consists of from 20 to 30 members and they are known to have 3 rifles and 1 revolver. They live in the mountain district near the center of the island, where they raise crops for their maintenance, occasionally descending for some raid into the lowlands. The raid above mentioned was in revenge for the death a couple of years ago of one of the sons of Santos, who was killed when trying to commit some robbery in that barrio.

One Bitoc, a native of Pandan, is supposed to be a ladrone chief with a small band in the mountains back of Pandan. He is not known to have firearms and no depredations have been committed by him during the year. He is apparently living with the mountain people. The third band is captained by one Juan Eugenio, and belongs in the vicinity of San Remigio. They are not known to have firearms and have committed no depredations during the year.

The principal thing Antique has to fear is a sudden attack on some of its interior towns from one of the several strong bands who inhabit the mountains on the Iloilo side of the border, and who can readily cross over in the dry season.

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Bohol.—Bohol remains as ever very quiet and peaceable, its inhabitants enjoying great security of life and property. No constabulary have been maintained in Bohol during the year. It is the intention to place in the provincial capital 1 officer and a small detachment of 10 men to assist the governor principally in inspecting and instructing the municipal police of the several towns.

Capiz.—Peace conditions have been excellent in Capiz during the year, notwithstanding the fact that one of the constabulary companies was absent for a considerable period on detached duty due to the outbreak in Leyte. There seems to be still considerable stealing of carabao in some parts of Capiz. There seem to be no organized bands of armed ladrones in Capiz, although there are known to be a number of firearms in the mountains in the southern part that formerly belonged to a Tagalog revolutionary company that occupied Capiz before the American troops were sent there. It is thought that we will be able to take up these arms.

Cebu.—There can be no doubt of the statement that conditions in Cebu are better than they have been during the American occupation. The hard work and unceasing pursuit of the ladrone band captained by Quintin Tabal and his brother Anatalio, that have terrorized the central portion of Cebu many years, has borne good fruit through the instrumentality of Governor Sergio Osmeña, who induced the leaders to surrender to him, with all their arms and followers. Governor Osmeña has been untiring in his efforts for peace and good order. With the assistance of the constabulary he has been successful in ridding Cebu of all of the professional leaders.

The Tabal band has been cleaned up from the central part of Cebu. In the north, Petronillo Esnardo, a leader of considerable prestige, who was credited with being a powerful anting-anting man by the people, has been finally captured by the governor and his police and is now under sentence of life imprisonment.

Ruperto Caballero, another leader in the north, along the west coast, has also been captured through the efforts of the governor and is now under sentence of life imprisonment.

Through the efforts of Quintin Tabal, Agustin Pardines, the leader in the Naga country of the south of Cebu, has been captured and sentenced to imprisonment for a number of years.

One Cipriano Padiugdug was also captured, but made his escape from the municipal jail of Tuburan. A leader credited with some skill with the anting-anting, named Manuel Martinez, has also been recently captured by the police of Argoa. In fact there are at present no organized bands of ladrones with arms in the island of Cebu. In the southern part of the island, however, there are several fugitives from justice who roam from village to village imposing on the ignorant country people. Effort is being made, with the assistance of the municipal police, to capture them.

The mountain people of Cebu are quite the same as the town people, i. e., Christianized Filipinos, who live back in the hills away from the towns, which are all on the coast. There is a feeling of great antagonism among the hill people toward the town people that if aroused and directed by a skillful leader, can be fanned into action almost any time. The people in the hills are densely ignorant and superstitious and claim that they receive no benefit from the taxes which they pay to the towns. The visits of Governor Osmeña to the various mountain barrios have done a great deal to alleviate the feeling, but there can be no doubt that it still exists to a considerable degree.

Iloilo.—Peace conditions are not altogether satisfactory. The principal disturbances during the year were the robbery of a train of carts, on February 8, en route to the Januiay market, of merchandise to the value of nearly ₱1,000. Most of the goods were recaptured by the constabulary, but the robbers made their escape to the high mountains. The barrio of Ambirijon, municipality of Tubungan, was attacked by armed ladrones in April, 4 people being killed, 10 houses burned, and 6 carabaos stolen by the thieves, who made their escape to the mountains. There has been a good deal of carabao stealing going on in the province also. In a number of cases the animals have been recovered by the constabulary and some of the thieves sent to prison. There have been several assassinations in the province during the year, chiefly due to gambling disputes or old family feuds.

There are said to be 8 bands of ladrones with firearms in Iloilo Province. I believe that ladronism in Iloilo is of very long standing, has existed for many decades, and that its complete eradication will be a work of time. The principal outlaw bands are (1) the band of Sano and his brother Oto, who live in

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the mountains in the northwest corner of the province, and who are supposed to have 4 military Krag rifles and 8 or 10 other firearms; (2) the band of Torribio, who is a son-in-law of Sano, and somewhat under his jurisdiction. This band lives in the jurisdiction of the town of Leon, in the mountains to the westward. They are supposed to have 6 rifles and 1 revolver; (3) the band of Yde, also in the mountains to the west of Leon, is supposed to have 12 firearms.

The other bands in the province are not so important and are mostly somewhat under the control of the above influential ladrone leaders. They inhabit the foothills and make raids on the small villages in the lowlands to rob, or sneak through the country at night to pick up carabao.

The outlook this year is not any too good, because the locusts have eaten a great deal of the rice that the people have planted in the last three months. The railway under construction between Iloilo and Capiz, however, gives employment to a number of men, and with the coming of the dry season it is hoped will give employment to a greater number.

Leyte.—Leyte has been the scene of the principal disturbance in this district. The outbreak began there with the assault on June 19, 1907, on the town of Burauen, and continued throughout the year, having, just at the end of the fiscal year, been brought to a successful end. All the leaders have been captured except one, Felipe Idos, who is supposed to have only 1 revolver and no particular following. After the attack on Burauen the pulahan movement gained such strength that it was quickly seen that the movement was beyond the strength of the constabulary, and the regular troops were called upon. The troops arrived in July, just in time to save attacks by the pulahanes on several towns. On July 17, Lieutenant Williams, with a detachment of constabulary, successfully attacked a strong force of pulahanes, killing 1 and capturing a quantity of supplies. Four days later the same officer, with Lieutenant Worswick and an American scout, McBride, and 34 constabulary, were en route to attack the pulahanes about 2 miles from Burauen when they were rushed by about 200 with bolos and badly cut up. Lieutenants Worswick and McBride and 12 men were killed. This accession of 12 rifles immensely increased the pulahanes' strength, and on July 24, in the village of Tabon-tabon, there was a fierce encounter between the combined column consisting of 50 constabulary and 26 Regulars, under charge of Major Nevill of the constabulary and Captain McMasters of the army, and a force of some 450 pulahanes. Fifty pulahanes were killed in the fierce rushes they made on the troops, who were most skillfully handled by the officers. On August 9 a column of Regulars under Lieutenant James, Eighth Infantry, was attacked by the pulahanes at Julita, resulting in the death of Lieutenant James, Doctor Snyder, and a volunteer with the party, Internal-Revenue Agent Williams, and several soldiers. The pulahanes secured 3 Krag rifles and 3 revolvers. Lieutenant Treadwell of the scouts lost his life on September 10 in an attack by the pulahanes on his camp. On December 5 a combined column of 25 men of the constabulary, under Lieutenant Yates, and Company L, Eighth Infantry, under Captain Ham of that regiment was attacked near La Paz by a strong body of pulahanes, who were led with great fanaticism by Basilio Samson. Samson and 40 of his followers were killed, the troops losing 5 American soldiers and 3 rifles. Lieutenant Yates of the constabulary was severely wounded.

The result of this last encounter seems to have been the turning of the tide, and from that time on the people of the settled portion of the country, in the lowlands, apparently had enough of the pulahan movement, and the band withdrew to the mountains. On January 6 they were successfully attacked in their mountain trenches by a column under Captain Christman of the Sixteenth Infantry and Lieutenant Hemmett of the constabularly, assisted by volunteers from Dagami. Until May 21 there were no more encounters. On that date a small detachment of constabulary under Lieutenant Snodgrass of the constabulary, accompanied by 2 American soldiers, ran into a pulahan camp near Guinarona, the result being a severe wound for Lieutenant Snodgrass and the scattering of the pulahan body. From that day on they were rapidly picked up by troops or volunteers or surrendered with their rifles. On June 11 Lieutenant Jones of the Eighth Infantry, with a detachment of his company and a detachment of scouts, struck a group of 4 pulahanes who refused to halt and at whom he directed shots to be fired by 2 picked men. One of the pulahanes was wounded and captured and proved to be the famous leader, Faustino Ablin, styled by the common people "Papa" or "Pope" Faustino. This ended the campaign.

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The work done by the troops in Leyte, under the various officers, was difficult and involved much hardship, as the mountain districts were most thoroughly patrolled and covered by detachments that remained days and weeks in the mountains, searching the most inaccessible corners. This skillful plan, so thoroughly executed by the troops, resulted in driving the pulahanes out of the mountains eventually to the lowlands, where they could be captured. The troops in Leyte under Colonel Smith, and the immediate commander at Burauen, Major Bell, not only performed most arduous service, under trying conditions, but the work was done with the least practicable disturbance of ordinary conditions and the least harm to the people. Mention should be made of the assistance of the people of Leyte themselves in capturing Faustino and his band. While no doubt their efforts were often without results and ineffective, yet the people, especially of the towns of Burauen, Dagami, Tanauen, on the east coast, and of Ormoc, Albuera and Baybay, on the west coast, turned out sometimes by hundreds and sometimes to the number of four or five thousand in all as volunteers. Several detachments of volunteers were regularly armed by the constabulary with firearms and maintained a semipermanent organization during the trouble, but most of the volunteers went out simply with their bolos and assisted in searching a certain country or in beating up the underbrush of a particular region. Many of them went to the mountains on expeditions for a number of days, suffering great hardships, due to the constant rains and to the roughness of the trails. The efforts of the provincial and municipal officials were of great assistance to the authorities and were cheerfully given.

The uprising in Leyte at its widest embraced only the minority of the people, affecting the central section, while the greater portion of the island, at the north and the south ends, remained tranquil throughout. There are some 34 municipalities in Leyte and at most only 8 were affected by this trouble.

The cause of the outbreak is difficult to determine. While the trouble seems to have had absolutely no connection with the pulahan movement in Samar, it was probably not unlike it in character. It was probably partly due to the great ignorance of the people living in the foothills, who were easily aroused by Faustino, and it doubtless represented the accumulated resentment of years of these country people against the town people, especially against the municipal authorities. No doubt a great factor was pure outlawry or the spirit of plunder, once the movement got well under way.

Faustino himself is a perfectly ignorant man, who can neither read nor write. He is 53 years old and a native of the outskirts of Ormoc. He is the youngest of a large family, and has himself 5 living children, 4 of whom have been with him in the hills. His wife is still with him and has shared his hardships in the mountains also. About 1887 or 1889 he was, by the Spanish authorities, arrested for having organized a fanatical movement known as the Dios-Dios movement. He was taken to the penal colony in Zamboanga, San Ramon, and also to Iligan and Marahui. In all he was absent some ten years, during which time his family lived in Ormoc. He says he was brought to Iloilo with a number of others about the time of the American occupation of Iloilo, and that he was sent to Negros, where the American authorities released him and allowed him to go home. He joined the insurrection then in progress in Leyte, and when the leaders finally surrendered in Leyte, he refused to come in, and has been an outlaw ever since.

In fact, Señor Jorge Kapili, of Leyte, who, with his column of 75 volunteers, remained in the field for a number of months, helping us last spring against Ablin, was the last of the leaders to surrender in Leyte several years ago, but apparently they could not induce Faustino to surrender. Faustino can give no intelligent idea of himself or of his plans, simply stating that he preferred to live in the hills, and giving various more or less incoherent accounts as to his religious or fanatical plans.

The campaign in Leyte wound up with a good deal of enthusiasm, and has, I think, left a minimum of bad feeling behind. All seem to be delighted that the trouble is over. Conditions there now are very quiet and efforts are being made to catch the remaining outlaw at large. The most harmonious relations existed between the army and the constabulary while they were working side by side. Much assistance was rendered the constabularly by the various army officers, and the senior inspector mentioned in his report especially the aid that was given them by General Lee, now retired; General Borden, now retired; Colonel Smith of the Eighth Infantry, Major Bell of the First Infantry, and a number of subordinate officers.

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Negros Occidental.—Negros was very quiet during the year except for the startling outbreak, February 12 and 13, when the outlaw leader Isio, chief of the babaylanes, as the pulahanes in the mountains of Negros call themselves, burned a portion of the town of Suay and the principal part of the village of Cabancalan.

Early in the night of Ferbuary 12 about 20 pulahanes entered the town of Suay and burned 24 houses and tried to spread the rumor that the entire province was rising in revolt. There was no constabulary in Suay, which is a small place. The band proceeded to Cabancalan, arriving early in the morning, by a circuitous route. There were 19 constabulary in Cabancalan, a corporal being in command. On receiving notice of the presence of the band in Suay, the corporal took 12 men and proceeded by the main road to Suay, but failed to meet the bandits en route. This left only 7 men in Cabancalan who, on the approach of the pulahanes, again made the mistake of dividing the force, 4 of the men going out to meet the pulahanes and 3 remaining in the quarters. The force, being without a leader, was too small to withstand the band, which had increased in strength to perhaps 100 persons with bolos and about 4 with rifles. The constabulary detachments were defeated in detail, the corporal in command being killed. The detachment that had gone to Suay returned on failing to meet the pulahanes and engaged them on the outskirts of Cabancalan, driving them back to the mountains.

The result of the raid as an attempt to create an uprising in Negros was a dismal failure because the people as a whole took no particular interest in it. Still it made a great deal of excitement among property holders and created an unsettled feeling.

The country affected by Isio and his band is the south-central portion of Negros. He lives in the densely wooded and rough mountains, and so far the numberless expeditions that have gone against him have been unable to get into his camp without his receiving warning in some way and escaping. He camps, of course, in inaccessible spots and uses the greatest precautions to prevent surprise, including many useful mechanical devices by means of which persons approaching are forced unconsciously to make a noise by setting off traps that roll stones down the mountains or that fling spears at themselves. Isio has undoubtedly lost prestige in Negros and we have been able in the last few months to get in touch with hundreds of the mountain men who have pledged themselves to assist us in capturing him. These people were once his sympathizers and subjects. This I regard as a distinct step in advance, because we need the assistance of the mountain people in order to capture an outlaw like Isio.

The following interesting extract is here inserted from the annual report of the senior inspector of Negros, Capt. George B. Bowers, as giving a very clear description of such an organization as Isio's band and a clear idea of the different classes of people that inhabit Negros and many other provinces:

BABAYLAN OR PULAHAN.

From time immemorial there has existed an organization known as babaylanes. This was merely the protest of the wild against the new order brought about by civilization. It used religion as its base, not religion in the commonly accepted term, but that conglomeration of ignorance and superstition in which some one comes forward and by his cunning and deceit appoints himself a god, a pope, priest, or some other, meaning leadership, authority, or power.

During the Spanish régime there were many gods, popes, and chiefs. If one was killed or captured there was always another to take his place. When the Spanish Government capitulated to the revolutionary there was one of this long line with which the insurgents were compelled to treat and to conciliate. This was Dionisio Magbuela, who now styles himself Dionisio Papa. He now has a band consisting of about 15 active followers, the principals being Juan Mayo, Marcelo Tuyo, Eugenio Alcachufas, and Eugenio Tolatola. Dionisio Magbuela, commonly known as Dionisio Papa, or Papa Isio, is a man of about 65 years. When yet a boy his father brought him with the rest of his family from Panay to Himamaylan, Negros, where the father established a small farm in the foothills. Here they lived until a landlord ordered them to move. This the family did, going to Payao, where the father and mother died and the family was broken up. There then was left but 2 brothers, Dionisio and Cristomo. All this happened at least 40 years ago.

While living in Payao, Dionisio was employed as a tuba carrier. In about 1880 he went to Isabela where he became herder for the Montilla family. He

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lived in the vicinity of Magallon and herded the cattle on the large cogon plains near that place. Soon after this he became involved in a quarrel with a Spaniard near La Castellana, which resulted in the wounding of the Spaniard and Isio's flight to the mountains. Some time previous to this a celebrated chief named Baraua Dios had been killed. The time was ripe for another leader. Isio announced himself as "Pope." He was accepted by the people in the mountains as their leader. He erected rude churches, baptized, performed marriages, blessed his followers, and deceived them by selling them charms or "anting-antings." In this manner he came to have great prestige with the people of the mountains and the laboring class in the lowlands.

Up to the year 1896 the babaylanes confined their operations to the mountain district and did not pretend to have a political character. But in this year began the agitation against the Spanish government. Isio decided to take a part. He made his first attack in the lowlands at Magallon. Here the guardia civil overtook his force and killed more than 50. This was the beginning. They next appeared near Cabancalan, where several hundred were killed. As the country was ripe for insurrection the inhabitants did not look upon this as outlawry, but as a legitimate manifestation of the outraged public. This secret encouragement had the effect of so increasing the number of adherents as to include almost 90 per cent of the inhabitants of the southern half of the province. They no longer called themselves babaylanes but pulahanes, or insurgents. The directors of the insurrection of 1898 had used this as a means to enlist the lower class in the revolution.

In 1898 the Spanish turned over the government to the insurgents. Isio at the head of his horde was a menace to the newly organized government. The leaders decided to use a policy of attraction. He was invited to Bacolod, where he was wined and dined. He was received in and visited the homes of the best people. He drove in uniform with the governor of the province and dined with the president of the republic of Negros. He was received as a visiting potentate. On leaving Bacolod he carried with him a commission as military chief of La Castellana, relieving an educated half caste, who, in turn, was appointed to a subordinate position. Here he increased his power, as this recognition gave him greater prestige. The educated class considered this an outrage. Isio began to talk of proclaiming himself governor or president. His followers numbered many thousands. The officials of the government began to fear that he would establish a plebiscite in which would reign anarchy. A commission was sent to invite American protection. This was done in 1899. Immediately Isio and his people declared themselves enemies and began a campaign of murder, arson, and rapine. It is not strange that after such a display of power that the thousands who followed him yet retain a feeling of awe that prevents them from going into, with heart and soul, any scheme which might result in the death of him who had shared with them the hardships of the past.

Since 1900 to the present time Isio has been in the mountains. At least once each year his forces with fanatic zeal attack some part of the province. In 1901 he entered Payao and burned it to the ground and killed a number of people.

In 1902 they killed a number of scouts and volunteers near Himamaylan.

In 1903 they changed to the vicinity of Murcia, where they were engaged by Captain White, and one of the leaders, Dalmacio, was captured.

In 1904 La Carlota was the field of action. The farm of a Spaniard was attacked and sacked. Several prisoners were taken to the mountains; one, the brother of Lieutenant Guaso, was killed by them.

In 1905 they entered Isabela and occupied the town for several hours, but the timely arrival of the constabulary prevented the burning of the town.

In 1905 it was supposed that Isio had been killed. That has since proved a mistake. The person who had been recognized as Isio was one Rafael Agosto.

In 1906 the constabulary was kept exceptionally active and there were no raids of importance. During the first months of the year Isio moved his camp to the hills near Canlaon, where he was attacked by Sergt. Ledesma and defeated. They lost several arms and men. In 1907 was the attack on Cabancalan.

Marcelo Tuyo is a native of Antique. He is a man of about 55 years. About fifteen years ago he came to Himamaylan and worked as an engineer in a hacienda of an Englishman. In 1896 he entered the ranks of the pulahanes as a general. In 1901 he surrendered and lived in Isabela. Three years afterward he became involved in a sugar steal and to escape punishment went to the pulahanes again. He is a man of the lower class, but far more intelligent than the average. He does not speak Spanish fluently, but can understand it.

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Juan Muyo is a native of Antique, about 50 years of age. He is said to belong to the middle class. He speaks, reads, and writes Spanish. He came to Negros about twenty years ago as a foreman of laborers, working on the farms. Some time after the revolution he became manager of one of the haciendas of Carlos Gorrea, a mestizo of La Carlota, where he worked several years; to be exact, until 1903. This ended with a dispute about the profits in which Muyo considered himself the injured party. He swore vengeance and joined Isio. This was a great surprise to the people of La Carlota, as he had always borne a good reputation and was considered a trustworthy and honest man. He is the best educated man of the band.

Eugenio Alcachufas, a native of Cebu, is about 50 years of age. Little is known of his past history except that he has been with Isio for the past three years. It is said that he commanded the attack on Lieutenant Walker, Philippines Constabulary, in Cebu a few years ago. In that fight the lieutenant was killed. Spies report him to be one of the most important chiefs and a favorite of Isio.

Eugenio Tolatola, of Himamaylan, is about 50 years of age. He has been with Isio since the revolution. Formerly he was a private in the guardia civil and a sargento of Cuadrilleros.

These men are the leaders of the present pulahan organization. They are armed with 5 rifles and 2 revolvers. These are reported as being 1 Mauser, 1 Springfield carbine, 1 Springfield rifle, 2 Remington rifles, 1 Colt's revolver, and 1 small bulldog revolver. Their supply of cartridges does not exceed 25.

The provincial and municipal authorities in Negros are doing everything to help, and with their assistance results are hoped for.

Negros Oriental.—Negros Oriental remains as usual very quiet, there being little or no outlawry or disturbance. Its people are naturally threatened, though not to such an extent as the western part of the island, by the existence of Isio in the hills. The authorities of this province are all assisting in the efforts being made now to capture Isio.

RELIGIOUS AND POLITICAL CONDITIONS.

Religious strife does not seem to have disturbed the peace of any part of the district during the year. There is rivalry no doubt, but it does not stir the passions that were aroused a few years ago. The senior inspector of western Negros remarks that "the people have 'cooled' down. Now one seldom hears anyone mention those questions, 'Friar lands,' 'Aglipay,' etc., which at one time were favorite topics of conversation."

In Antique there are many Aglipayans, while in Negros they are also strong. In Cebu the only Aglipayan church is one at Jagnaya. In Iloilo there are a number of Aglipayans, also in Romblon. Cebu, Bohol, and Leyte have practically none, and I think there are few, if any, lawsuits over church property pending in these provinces.

There are a number of suits pending, however, in the supreme court over churches, cemeteries, parish houses, and similar property in the several provinces on Romblon, Negros, and Panay islands. There are 13 in Iloilo, 37 in the whole of Negros, 13 in Antique, and 8 in Romblon.

Much political interest is manifested over the elections for assembly in the larger towns, though the mass of the people take as a whole little interest in political affairs. While the rivalry between candidates is keen, nothing to affect the public peace has occurred. Except in the larger towns party lines are not drawn, nor are parties even organized after the lines of the Manila parties, but are formed rather on personal or family associations.

MUNICIPAL POLICE.

Efforts are being made to improve the condition of the municipal police by assisting the village authorities in their instruction and by more frequent inspections of the condition of the police and the condition of their arms. The district is so short of officers that we can not do much yet, but the senior inspectors are doing all they can and taking much interest in assisting the police. One great drawback to the efficiency of the police is section 26 of act No. 82, which makes the term of the police end when the presidente's term expires. The law should be amended to except the police from the operation of the paragraph requiring them to be engaged for periods of two years by the councils.

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WILD TRIBES.

There are Negritos in small numbers in Antique, Iloilo, and Negros. Montescos, or uncivilized Filipinos, are found in considerable numbers in the mountains of Antique, Capiz, Iloilo, and Negros. In Cebu, Bohol, and Leyte there are no wild tribes, the inhabitants being all Christianized people.

As in other parts of the archipelago, the efforts of the constabulary are so much taken up in protecting the people of the villages that there is not sufficient force to occupy the hills and to control and protect the wild tribes.

When the time comes that the village police are able to do more toward protecting life and property in the lowlands, the constabulary can move to the hills and control and take care of the mountain people and prevent the mountains from being a resort and a recruiting ground for criminals from the lowlands.

Excellent work is done by the constabulary hill stations in Cebu, Ormoc, and Leyte, and it is a matter of regret that they have not more of them.

In the outbreak in Leyte several years ago the barrio of Dolores, in the foothills above Ormoc, was deeply involved and the scene of conflict. During the recent outbreak that barrio went on and tilled its fields, made hemp, and paid no attention, although Faustino is a native of a neighboring barrio of the same town of Ormoc and at the beginning had more than a hundred Ormoc people with him. The reason was that Dolores had become settled down since the establishment of the constabulary station there, and the people, knowing the pulahanes could not enter and molest them, were glad to be out of it all. Another mountain camp above Ormoc, but to the south, has been established on the slopes of Mount Mahilaom, outside of barrios that are now being rebuilt by their inhabitants who became scattered during the struggles.

CONSTABULARY ORGANIZATION AND EQUIPMENT.

The constabulary of the district is in good condition, the receipt of a portion of the new rifles being the greatest improvement. The Krag-Jörgensen carbine of the army fitted with a longer stock and with the Krag infantry rifle bayonet makes an ideal gun for the brush.

Several matters thought desirable for the organization have been suggested to the director in special reports from time to time.

RECOMMENDATIONS.

There can, I think, be no doubt that life and property in this part of the archipelago are better protected, and that peace conditions are much improved year by year.

The great drawback is the lack of means of communication from town to town by roads, bridges, and telephones.

The amalgamation of the towns by which the number was reduced by the Commission in 1903, seems to have fallen rather heavily on some of the provinces, especially on Iloilo, where the report of the governor-general (p. 83, Vol. I, Report of the Commission, 1903), for the year shows the number of towns to have been reduced from 51 to 17. Heavy reductions were made in Western Negros also—34 to 21.

It would be a useful and wise measure to secure the appointment by the governor-general of a special committee to inquire and report as to whether the expectation hoped for from the consolidation has been realized and whether some of the towns should not have their individuality restored.

Such a committee could well consider the subject of the practicability of the appointment of delegates, or subgovernors of some sort, to supervise, protect, and represent, as it were, the hill peoples of Leyte, Cebu, Negros, Antique, Capiz, and Iloilo, and to outline the powers and duties of such officials. The municipal governments could hardly be expected to perform the functions needed to care for the mountain peoples, who under the present division of territory are all within the jurisdiction of some municipality.

These two subjects will be found, I am confident, to have the very closest relation to matters of peace and good order in the provinces concerned.

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Great harmony has existed between the constabulary and the provincial and municipal authorities whose assistance is much appreciated. The relations between the constabulary and the people are also excellent.[a]

Very respectfully,

W. C. RIVERS,
District Director.

The EXECUTIVE INSPECTOR, BUREAU OF CONSTABULARY,
Manila, P. I.

REPORT OF THE DISTRICT DIRECTOR, FOURTH DISTRICT.

FOURTH CONSTABULARY DISTRICT,
OFFICE OF DISTRICT INSPECTOR,
Vigan, P. I., July 1, 1907.

SIR: I have the honor to submit the following report of the fourth constabulary district for the fiscal year ended June 30, 1907.

PEACE CONDITIONS.

The peace conditions in the fourth district, taken as a whole, are very satisfactory. There are no organized bands operating in any of the provinces. The only attempt of this character was made in Ilocos Norte, but through the zeal of the governor of that province was quickly squelched.

The maintenance of peace is afforded the people by devoting the constabulary to the suppression of crimes against the person, the destruction of the large cattle-stealing traffic, the discouraging of raids on the part of the non-Christians against the farmer in isolated localities, the bringing of our moral influence to bear on the non-Christians to recognize the law, by affording protection to the life, liberty, and property of non-Christians in neighboring rancherias, and by encouraging friendly relations among all the rancherias which have been at enmity with each other, so that their future dealings may be without fear of the treacherous spear or head ax.

RELIGIOUS CONDITIONS.

The religious conditions in this district are such as to give not the slightest cause for alarm, in contradistinction to the state of affairs that seemed to exist three or four years ago. The differences of opinion on this subject are of such long standing with the people that they have become accustomed to it, and a spirit of tolerance now prevails everywhere.

POLITICAL CONDITIONS.

The political conditions of this district with but a few exceptions are extremely quiet, the people in general not being specially interested in the coming elections for representatives to the Assembly. The interest in these elections seems to be confined practically to the various candidates and their immediate followers. The general impression seems to prevail that the elections for these offices are of minor importance and not to be considered with those for presidentes. While there are, in some cases, strong efforts on the part of the candidates to awaken among the people an interest in their respective merits, the casual observer while traveling through the provinces, unless seeking light on the subject, would have difficulty in discerning any symptoms of our being on the eve of an election.

ECONOMIC CONDITIONS.

With the possible exception of Cagayan, the economic conditions are gratifying, as evidenced by the general spirit of contentment that seems to prevail in all the provinces. A noticeable feature is the erection of new buildings and

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[a] A number of tables showing number of arms captured, animals recovered, engagements, casualties among constabulary and outlaws, and operation of the municipal police have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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the repairing of old ones, as well as the cultivation of untilled lands or land neglected for many years.

All along the coast may be observed the keen interest that the people are taking in the cultivation of maguey. Even in some of the mountain sections this industry is awakening a lively interest in anticipation of obtaining machinery for the purpose of stripping the plants, in lieu of the salt-water process now used. This zeal is brought about by the high price for which maguey has been sold this year, namely, from 10 to 14 pesos a picul. Aside from this fact the maguey plant suffers neither from langostas nor drought. In the promotion of the maguey industry the other natural products of the provinces have by no means been forgotten. On the contrary, they have been pushed to such an extent that in nearly all the provinces the production has been a banner one. With the closing of the vacation period and the opening of the schools, a further evidence of the general thrift and prosperity is given by the neat appearance and dress of those attending; all are dressed neatly and with a comfort that but a few years ago was noticeably absent.

CONSTABULARY.

The efficiency of the constabulary of this district is very good, but their number is entirely inadequate, both in officers and men, for the work that is expected of them. The element of time has possibly had a different effect on conditions and affairs in this district than on the districts in other parts of the archipelago. Having a large population of non-Christians, and in every province a great area of country capable of development, the elimination of the ladrone bands has brought out the suggestion of extending the benefits of civilization among the non-Christians by the establishing of constabulary stations in their midst.

This not only affords them greater security against neighboring tribes, but also opens up the country to ambitious Filipinos, by affording them protection in their agricultural pursuits, as well as to the "traveling comerciante." This matter has been given considerable attention in the province of Lepanto-Bontoc and is now being taken up in Cagayan, Isabela, Ilocos Norte, and Abra.

The establishing of two additional subprovinces in this district—one in Lepanto-Bontoc and the other in Cagayan—necessarily calls for more troops in order that the purposes of the government may be materially advanced. To do this requires more officers and men. As it is, the demands made on the constabulary throughout the different provinces, for the protection of people working in the fields against the barbarities of these non-Christians, are such that it is impossible to begin to comply with them. While there are only 6 provinces in this district, there are also 5 subprovinces to be taken care of, all of which, by reason of the delicacy of the work to be handled, should be officered by men of experience, capable of cooperating with the lieutenant-governors of their respective subprovinces. Moreover, in dealing with the non-Christian, the arms with which the government has intrusted us are only to be used when every other possible means has failed. This in itself requires that the men placed over the detachments in non-Christian provinces be men of judgment and tact, that the work and desires of the honorable secretary of the interior may be carried out.

There is not one of the provinces that does not suffer from raids made on the Christian settlements by these non-Christians, and naturally the fear is such that much land belonging to Christianos located in those localities is untilled and neglected. If the constabulary is expected to do anything, it should certainly afford these people the necessary protection, and be provided with the means to do it.

In carrying out this work among the non-Christians the progress has been somewhat retarded from the fact that Nueva Vizcaya is in another district and that the district director is not in as close touch with the policy of the provincial governor of that province as he otherwise would be. The constant friction that arises between the outlying or boundary rancherias—that is, those bordering on Lepanto-Bontoc, Nueva Vizcaya, Isabela, and Cagayan—has been such that while long on letter writing we have been short in results. These people are constantly at war, and any feuds arising from their head-hunting practices that require to be settled are more difficult to handle on account of having to be done through separate districts. With a view to overcoming this

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difficulty I would suggest the changing of Nueva Vizcaya into the fourth district, renewing the recommendation I made over two years ago in one of my reports.[a]

SUBSISTENCE.

The question of subsisting detachments stationed in non-Christian localities is at times a serious one, owing to the lack of supplies obtainable where many of the detachments are stationed. The transportation of supplies during the rainy season over mountain trails and swollen rivers is not only difficult but dangerous for the cargadores, so that at times it is almost impossible to obtain them to transport enough supplies to exist on. In consequence of this condition of affairs it has been necessary to authorize the detachment at Tauit, Apayao, to purchase six months' supplies, paying therefor one-sixth monthly. It may be necessary to have the same arrangement at Mauanan, Tabuc, and Mayayao, as not even rice can be purchsed at any of these stations. Aside from these difficulties, frequent demands for cargadoring among the Igorots or Calingas cause constant irritation, thereby adding obstacles to the successful influence of the station commander over these people. With the exception of the above stations, the subsistence of the troops is ordinarily very satisfactory, all of them being able to amply supply themselves with good, substantial food, and incidentally have sufficient savings to add to their material comfort and recreation.

CLOTHING.

In nearly all cases the men have been able to clothe themselves well on their clothing allowance. It is believed from observation that the large amount of money that many of the men draw on final statements is not due to the clothing allowance being too large, but rather to their practice of having their uniforms made by the local tailors. The present system appears to be entirely satisfactory.

ARMS.

The first company, constabulary of Ilocos Sur, and the first company, constabulary of Isabela, have been armed with the new remodeled Krag carbine within the last few months. With the exception of these two companies, the constabulary of this district are all armed with the old Springfield carbine, caliber .45. These arms are not only obsolete, but a large number are unfit for service. This was clearly shown in the course of range practice which was held in this district during the months of May and June. Several companies have shipped all their old guns to the ordnance officer and been supplied with new ones, but even these would not give satisfactory service in case any emergency should arise requiring the use of an effective weapon. From the short time that the new remodeled Krag has been in this district, it can be clearly seen that it is the most suitable weapon for the native soldier that can be obtained, and the bayonet makes it a particularly effective weapon.

BUILDINGS.

Buildings owned by the government are being used as barracks at the following places: Laoag, Ilocos Norte; Bangued, Ilocos Sur; Candon, Ilocos Sur; Ilagan, Isabela; Cervantes, Lepanto-Bontoc; Bontoc, Lepanto-Bontoc; Lubuagan, Lepanto-Bontoc; and Balbalasan, Lepanto-Bontoc. The buildings at Ilagan, Isabela, and Cervantes, Lepanto-Bontoc, used as civil supply stores, are also owned by the government. These buildings are all in a good state of repair and are entirely suitable to our needs.

TRANSPORTATION.

From the records showing the transportation furnished the several provinces, it would appear to be ample for all purposes, but an inspection demonstrates the antiquity of the live stock and their uselessness in any extended campaign. Most of the horses in this district were turned over to the constabulary by

[a] Table showing the results of operations during the period covered by this report has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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the army in 1901 and have been doing duty ever since. Ordinarily the work of the constabulary horses over the mountain trails is such that if extraordinary care is not taken of them they quickly break down. There is no doubt but that some of the horses now used in this district, and which are considered practically unserviceable, could give good service in a country less broken than that found here. As it is, many of them are too old and practically not worth their forage for mountain work. We should have good, strong, live horses, either native or Australian, and it is believed that if this class of animals be furnished, it would be more economical, as the means of saving a great deal of time and expense, especially to officers making their inspection and pay trips.

MUNICIPAL POLICE.

The municipal police throughout the district, by their cooperation with the constabulary, are in general doing very satisfactory work, and in nearly all the provinces where they are under the supervision of the senior inspector are gradually assuming the semblance of an effective organization. Efforts are being constantly made to impress the constabulary officers throughout the district with the wisdom of interesting the provincial and municipal authorities in having an effective police force, capable of cooperating with the constabulary in the maintenance of peace and security, and the necessity of keeping the senior inspector advised of all crimes committed, so that he may get all the police forces throughout the province at work with the constabulary toward effecting the capture of the criminal, when at large, or the recovery of animals and other property lost, strayed, or stolen. The results have been gratifying, and in most instances the earnestness with which the police have entered into the spirit of their work has been exemplary. There are yet some exceptions to the rule in this respect, due to the reduction in the police forces and the cutting down of their salaries for economic reasons, but it is hoped that this difficulty will be soon overcome.

Monthly inspections of the municipal police are made and the local presidentes consulted as to ways and means to obtain the best results.[a]

CONDITIONS IN THE PROVINCES.

CAGAYAN.

During the past year the conditions as to peace have been good. While there are no outlaw organizations in this province, there is considerable carabao stealing going on. Even at this writing a report has just come of 7 carabao having been stolen in the town of Enrile. Everything possible is being done to suppress this evil by persistent work on the part of the constabulary and local police.

The internal-revenue agents have also met with more or less trouble in enforcing the law among vino distillers. The zeal with which they have carried out orders in the seizure and destruction of stills has been the source of much ill-feeling, particularly among those who have not complied with the law through lack of funds. In the prosecution of this work one native gauger was, on August 18, 1906, attacked near Abulug and severely beaten by 7 men, who also robbed him of his money, papers, and revolver. The revolver was recovered and the men captured by Lieutenant McIntyre, who commands the constabulary station at Abulug.

On April 9, 1907, Revenue Agent Wright, while engaged in taking an inventory of the vino on hand and the names of the working force of an illicit still which he located in the nipa swamps between Pamplona and Abulug, was suddenly attacked from behind by some one with a bolo and cut severely about the face, the cut running from the right forehead to the left cheek bone, destroying the left eye Wright managed to draw his revolver and fired two shots, but, being blinded with blood, hit no one, managing only to frighten his assailants away, when he then fainted. The pilot of Wright's boat was also wounded, but not seriously. The latter returned to the boat and, securing the assistance of the crew, returned and carried Wright to the boat and brought him to Abulug. Lieutenant McIntyre, after notifying his senior inspector,

[a] Table showing the strength of the municipal police of this district by provinces has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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started in pursuit of the assailants. The acting senior inspector, Lieutenant Clark, arriving on the scene, took charge of affairs, and succeeded in capturing the assailant who it is alleged committed the deadly assault. The other 5 associates through the influence of the padre of Pamplona, later surrendered to Lieutenant McIntyre.

The senior inspector reports much suffering among many of the poor people thrown out of employment by the destruction of these stills. In spite of the blighting effect on the vino industry, however, one modern vino still has begun work at Linao, and two more will soon be ready to operate in Pamplona.

In addition to the suppressing of crime throughout the Christianized portion of the province, many expeditions were made into the Calinga country for the purpose of establishing peace relations with the head-hunters. On one of these expeditions Lieutenant Greene with his detachment met with many difficulties in crossing the rushing mountain streams. Small streams, almost dry on going, would be filled from bank to bank on the return trip. On this trip Sergeant Taguba, while crossing the Chico River, was thrown from his horse by the strong current and drowned.

The latter part of July, 1906, Colonel Crawford, district director, Captain Knauber, senior inspector, and Lieutenant McIntyre and 7 men went on a peace expedition into the Apayao country. Many of the rancherias were disposed to be hostile, but in general peaceful relations were established. While descending the Abulug River on rafts, at the mercy of its rocks and torrents, Lieutenant McIntyre was thrown from his raft and narrowly escaped drowning. During this time Colonel Crawford and Captain Knauber were attacked. Lieutenant McIntyre being finally able to come to their assistance, the assailants were at last routed. Both Colonel Crawford and Captain Knauber were slightly wounded. The loss of the assailants is unknown. February 25, 1907, another expedition was made by Colonel Crawford, Captain Knauber, and Lieutenants Guild, McIntyre, and Hanlon, with 30 men, into the Apayao country of western Cagayan for the purpose of making a tour of inspection, peacemaking, map correcting, etc. On this expedition many rancherias were visited and peace relations established, but on reaching Ganed, the rancheria that had attacked them on their previous expedition, another fight occurred in which the Calingas were routed and all houses burned.

Details of this expedition are fully covered in Colonel Crawford's report rendered the executive inspector under date of March 14, 1907.

There is no province in this district that has suffered during the fiscal year as has Cagayan. First, a severe baguio struck the province September 18, 1906. It was especially severe in the northern part. In Aparri 200 houses were blown down; Gattaran, Alcala, Amulong, and Buguey were almost wiped out, and all communications cut off; tobacco in bales, bundles, and packages were floating down the river for four days; all barangayes that happened to be in the river were lost, and two launches were also sunk. It is estimated that the loss incurred reached ₱4,000,000, but so far as known only 9 lives were lost. Following the baguio there were many severe cases of sickness, in which a large number of the native inhabitants and Europeans were attacked with dysentry, resulting in many deaths. About the middle of November, on account of heavy rains, the Cagayan River and its tributaries rose to a height never before experienced by the oldest inhabitant. The towns along the river were entirely under water and a large number of houses were swept away; the loss of carabao, horses, and hogs was immense; all crops which had been planted were washed out; tobacco, food supplies, and seeds for the next year's crop were in many cases destroyed. Some of the people of Alcala reported counting over 300 houses floating past that town, most of them having people on top and in some cases inside on the rafters, calmly floating down the river to the sea. Fortunately nearly all were saved.

In Abulug the Abulug River rose to such a height as to menace the town. The presidente, who was unable to cope with the situation, turned over the town to Lieutenant McIntyre, the constabulary station commander in Abulug. The lieutenant, with his detachment, roused the people from their lethargy and compelled them to take a hand in saving the public buildings and property by removing them from the danger point. The safety of this property being assured, the people, roused by the example set them, proceeded to save their own property, so that the loss was comparatively small. The rise of the river was so great that it cut off and carried away over a hundred feet of land on which many houses had been built.

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The province has since been struggling to overcome the misfortunes of 1906 and has been bending every effort to avoid any possible distress among the people. While there will no doubt be some suffering among the people in localities affected by the destruction made by the river, in general most of the people are inclined to take an optimistic view. That part of the province not affected by the flood will have a good healthy production of tobacco and other food supplies, and there is a feeling of contentment which is especially marked in comparison with the condition of their less fortunate neighbors who suffered from the caprice of the Cagayan River.

Religious and political.—At present there is very little friction between the religious organizations. During the month of May it was thought that there might be some trouble between the Catholics and the Aglipayanos at the fiesta of Santa Cruz (a barrio, part of which belongs to Aparri, and part to Abulug), owing to both factions holding separate celebrations, but happily everything passed off very harmoniously. Politically everything is quiet, the coming election for the Assembly seeming not to interest the people very much. Only one or two candidates in each district have announced themselves, and as they are only known locally, not much interest is felt throughout the province.

Ex-Governor Guzman is a candidate for the first district, and his election is conceded. In the second district there are several candidates, one of whom is an American negro named William Hawkins, an ex-captain of volunteers, who has large interests in the Itaves district and now resides in Piat. For the autumn election it is understood that there are to be several candidates for both governor and third member, but so far none have publicly announced their candidacy.

Scouts.—One company of scouts, the Twenty-eighth, arrived at Aparri last March for the purpose of obtaining recruits, and are at present doing duty at that town. Their relations with the people and the constabulary are extremely amicable, and their presence is appreciated by the comerciantes on account of their bringing considerable money into the town.

Municipal police.—The municipal police, owing to the reduction of their strength from 212 to 130, have during the past year been more or less demoralized, but are now slowly recovering and the results obtained from their service are fairly satisfactory, considering their strength. In most cases the local police are poorly paid, and to enable them to exist they are obliged to have some outside source of income. At present there seems to be no remedy for this, owing to the inability of the towns to raise sufficient funds, but by persistent effort we hope to raise the standard of efficiency, even with the present reduced strength, to what we obtained under the old strength.

ILOCOS NORTE.

This province is at present in good condition as regards peace. An attempt was made last August to organize an unlawful band under the leadership of Valentin Butardo, but with the assistance of the wide-awake governor the matter was nipped in the bud. One hundred arrests, including Butardo, were made, thereby putting a quietus on the movement.

Carabao thieving still continues and while the thieves are being rounded up by the constabulary and local police, they so far have failed to eliminate the abuse.

A source of annoyance has been the desultory attacks, with murderous intention, made by the non-Christians on people working in the fields in outlying barrios. An effort is being made to cover the mountain sections by patrols so as to afford people there the necessary protection.

As to the prosperity of the province, there is no doubt but that the people are very much contented. The crops have been exceptionally large, the only possible exception being in the extreme north, but even there contentment seems to prevail.

Religious and political.—The church property question between the Catholics and the Aglipayanos is a subject of adjudication at present. Evidence is now being introduced by both sides in support of their separate contentions, and the discussion with reference to the question has been such that gives no doubt but what the matter will be settled amicably. With reference to the coming election, the people are too busy with material affairs, and the interest is practically confined to the candidates and their immediate followers. As the time for the election approaches however, efforts are being made to stimulate this interest among the people.

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Scouts.—There are no scouts or other military organization in this province.

Municipal police.—Regular inspections of the municipal police have been made during the year, and in the majority of cases they have been found to be fairly efficient. The cooperation of the police force with the constabulary has not been all that could be desired. This I do not believe was due to any diffidence on their part, but rather from lack of proper instruction as to how far their cooperation with the constabulary should extend. It is hoped that this condition will be largely improved, and the constabulary and municipal police so work in unison that the pernicious traffic of the carabao thief will be suppressed.

ILOCOS SUR-ABRA.

The conditions are good, in fact the past year is claimed to be the most prosperous in its history. The production of maguey, and the price obtained, has been far beyond the wildest dreams of the producer. Great efforts are being made to extend the cultivation of this plant, not only in Ilocos Sur but also in Ilocos Norte.

During the past year, Vigan shipped to Manila 16,369 quintales maguey, 63 quintales añil (indigo), 499 quintales tobacco, and 5,000 piculs sugar.

The people are without doubt contented, and evidence of their prosperity can be seen in the improvements being made in their homes, the erection of new buildings, and the neat and dressy appearance of the boys and girls attending school.

Even Abra, that has practically been dead so far as any evidence could be seen of their trying to recover from the effects of the insurrection, is now waking up and preparing to put on new clothes by the erection of new buildings. They have had there an excellent crop of tobacco, corn, and palay.

Having no organized band of ladrones, a spirit of tranquillity prevails. Were it not for the pernicious thefts of carabao, an abuse that still continues, and the feeling of insecurity in the outlying barrios of Abra against attacks of the head hunters, there would be little to do but look after the usual crimes committed everywhere.

Political and religious.—The religious conditions are very satisfactory, all of the different religious schisms following their respective beliefs without the use of any violence whatever. Whatever differences there may be extend no further than in a large expenditure of words. The political situation is quiet, although the various candidates for the Assembly are working tooth and nail to gain supremacy at the coming election. The people in general, however, do not seem to be very much interested. The only one of the three districts in which there is the least contest is the second or southern half of Ilocos Sur. The arrangement of "fences" for the election for governor and third member is going merrily along, and there is a great deal of rivalry at present between the presidente of Vigan, who is a candidate for the former office, and the present incumbent. This rivalry at times is such that the feeling between the candidates savors somewhat of a personal character, and a hot campaign is looked forward to as the time for election approaches.

Scouts.—There are no scouts or other military organization in this province.

Municipal police.—The municipal police are in general doing good work, but the pay is too small to attract efficient men, the average pay being only ₱7. The fallacy of having a poorly paid protective force was shown in the towns of Cabuagao, Bangued, and Danglas, where it was shown that attempts had been made to rob the municipal treasury and that these attempts were traced to the municipal police. The senior inspector is endeavoring to increase their efficiency and incidentally prevails on the municipal authorities to the extent of raising the standard by holding out the inducement of a higher salary. Regular monthly inspections are made, and so far as their equipment and personal appearance are concerned, they are very good.

ISABELA.

The present conditions are unusually quiet. No outlaw organizations are known to exist. During the year there has been considerable carabao stealing, but this abuse has been very materially diminished. As this carabao stealing was carried on to a great extent on the border line between Isabela and Cagayan, and was believed to be with the connivance of certain municipal officials, a detachment was stationed at San Isidro, Isabela. By the making of a few

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arrests and patroling the affected districts, the desired moral effect has been obtained, so that carabao stealing is now an exception rather than the rule, as formerly.

The baguio of September 18, 1906, which played such havoc in the Province of Cagayan, also caused great destruction in Isabela, the Tabacalera Company, Weber Brothers, and Don Manuel Nieto being the heaviest losers. All tobacco and corn from Echague to Cauayan was lost. Many houses were destroyed and animals lost. Only by herculean efforts on the part of the constabulary and provincial government were the people of the lower valley saved from starvation. Hardly had the people recovered from the effect of this disaster when they were again visited by a more terrific storm. The Cagayan River submerging the surrounding country and causing immense destruction to the tobacco interests almost brought the people to the verge of starvation, which would have been inevitable had not the province distributed rice among the sufferers.

About this time an expedition under the command of the senior inspector, Captain Poggi, went into the Mayayao country, with a view to preventing a head hunting expedition into Nueva Vizcaya. In this they were forestalled by the Igorots of Mayayao, who had already gone and secured the required number of heads. While returning from this expedition the larger portion of the command under Lieutenant Crockett were caught on the other side of the Magat River, which had risen to an unusual height by the unprecedented floods which devastated the entire valley at the time. In this predicament they were obliged to remain three days without food, all effort to relieve their situation from the outside and by themselves having proved unavailing. Five lives were lost, 2 constabulary soldiers and 3 cargadores. These men volunteered to make the attempt of crossing the river in search of food, only to be swept under the treacherous current and dashed against the rocks below. No trace of the bodies has ever been found.

Another expedition was taken in January into the Mayayao country under command of Captain Olson. The object of this was similar to the one previously made, i. e., to prevent Mayayao from making a punitive expedition against Alimit, a rancheria of Nueva Viscaya. The former were contemplating such a step for the purpose of taking heads in retaliation for some that had previously been taken by Alimit. This detachment succeeding in arriving before any damage had been done, and undertook to argue with the Mayayao people as to the necessity of giving up this custom. To all arguments their answer was the counting of three fingers, to indicate that that number of heads had been taken and it would require three heads from the other rancheria to bring about peace. However, they were induced to let the matter drop for the present and to keep peace so long as the other rancheria did.

It may be well to remark that these two rancherias had been at war with each other for a number of years before the American occupation, but on the arrival of the latter they were ordered to make peace. This was done and the usual pledges given by the exchange of presents. This peace agreement was kept until about four years ago, when it was broken by the Mayayao people, the reason being given that the agreement was no longer binding, as the grass on the ground where the peace meeting had been held was dead. Since then the war between these people has been kept up, and probably 20 heads have been taken by each side. To discourage this head-hunting practice, and establish a more peaceful and secure footing, a detachment of constabulary, under the command of Lieutenant Schuele, has been established at Mayayao. However, as there is practically a rice famine, the subsistence of the command and the transportation of supplies becomes a serious problem.

Since the detachment has been stationed at Mayayao they have succeeded in preventing several fights. About a month ago 30 Igorots, accompanied by 1 corporal and 2 soldiers, left for the Machanan. While cutting timbers for the new constabulary cuartel now being built, a band of Ynulubans appeared on the hill above them, and others of the same band on the hill opposite. The Mayayaos called and asked if they were friends. The Ynulubans replied that they did not want to be friends with the Mayayaos and threw their spears at them. The soldiers then fired 4 rounds at the Ynulubans, who ran off. No one was hurt.

In the maintenance of the law throughout the Christian part of the province, the greatest obstacle is the pettifogging "pica pleitos," with whom the province seems to abound, and their satellites, with a sprinkling of such disgruntled spirits as have been the recipients of justice. As an instance of the affrontery

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of these gentry, I may cite a case at Cauayan, where two prisoners were brought before the justice of the peace, tried and sentenced to twenty days by the court, and remanded to jail under the custody of the sergeant of the municipal police. A day or two after one of these pettifogging disturbers presented himself at a council meeting and demanded to know by what right these men were detained, and by a perversion of facts he convinced the presidente and council that they had a case of illegal detention on their hands, with the result that he secured the release of the prisoners.

Economically the people are about as well off as they have been for the past two or three years, having recovered from the disastrous floods of September and November, 1906. Of course there are still a number of people who have not been able to rebuild their houses, which were swept away at that time, but they are being taken care of by their more fortunate friends and relatives.

There are no epidemic diseases prevalent, and the general healthfulness of the people is good.

The tobacco crop has turned out very good, and it is expected that the price will be much higher, owing to the scarcity of the same in Cagayan.

Religious and political.—With regard to the religious and political status, there have been no religious disturbances of any kind during the past year. In fact the temperament of the two peoples who constitute the bulk of the population is such that a possibility of any serious difference is reduced to the minimum. The native Cagayano is too apathetic and the Ilocano too busy with his material welfare. Politics seem to play but a small part in the affairs of the people. Five candidates are in the field for representatives of the Assembly, none of whom seem to have any following, and the campaign is being carried on in such a manner that one would never suspect anything of the kind was going on.

Scouts.—There are no scouts or any other military organization in this province.

Municipal police.—A marked improvement in the municipal police has been noticeable in the last three months in their general appearance and the manner in which they perform their duties. This is the result of sweeping changes that have been made in the personnel. In Ilagan the former captain of police was allowed to resign on account of general inefficiency, and 10 of the police were dismissed and charges preferred against them for complicity in thieving carried on by the provincial guard. In Cabagan Nuevo the lieutenant in charge of the police was requested to resign on account of irregularities in office. At Echague an American has been appointed lieutenant of police and he has brought the force of that town up to a very good state of efficiency. In the remaining towns the police forces are very small, consisting of four or five in each town and the efficiency is correspondingly lessened. It has been found necessary to dismiss various members in nearly all of the towns for inattention to their duties, and other derelictions, so that the force is now gradually assuming the semblance of an effective organization, and their work of late has been quite satisfactory. As far as practicable inspections of the police are made monthly and show a marked improvement both in their appearance and efficiency. The improvement of the police force and general condition of the province is largely due to the activity of Captain Olson, who is a recent appointee as senior inspector.

LA UNION.

The province of La Union, generally speaking, has been quiet and free from organized bands of ladrones during the period covered by this report. Like other provinces along the coast it has had its share of petty robberies, but in the majority of cases, these have been committed by the people living in the provinces of Pangasinan and Tarlac. La Union, owing to its location, is the thoroughfare between Pangasinan and Ilocos Sur, and people making trips north and south are obliged to pass through it, so that when opportunity presents itself to the criminal element they rob the people in the isolated barrios. The presidentes of all the pueblos along the main road have given orders to the effect that all strangers in the jurisdiction of their respective pueblos, must remain near the tribunals at night and not in the barrios as has been their custom in the past.

La Union, considering its large population, location, and number of transients from other provinces, has but few criminals. During the past twelve months there have been 17 cases of robbery reported, and 18 persons arrested for same.

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Of the 18 arrested 7 were from Pangasinan, 4 from Tarlac, and 7 residents of La Union, which goes to show that the majority of the criminals operating here belong to other provinces. This province is practically free from carabao ladrones, there being only now and then an isolated case.

During the past year three baguios visited this province, one on September 6, 1906, one on September 19, 1906, and one on September 27, 1906. The first two did little or no damage, but the last one destroyed crops and buildings to the value of about ₱60,000 in the pueblos located in the southern part of the province.

In the months of August and September, 1906, the diseases surra and rinderpest broke out among the animals in the southern half of the province and killed about 175 ponies and 150 carabao. At the present writing some animals are dying in the pueblos of Tubao and Santa Tomás, but there are no symptoms of the diseases mentioned above.

Religious and political.—The religious conditions in the province are quiet and peaceful throughout the entire district. At present there are three churches—Aglipayano, Roman Catholic, and Protestant. During the past eleven months there has been no trouble between the followers of these orders, as each confines itself to its particular work and interferes in no way with its neighbor's views, customs, religious rites, or belief.

The political situation is somewhat strained and unpleasant, owing to the fact that there are two strong factions in the field, both of which are trying to down the other with a view to gaining supremacy in the question of the coming election for governor. The Hon. Governor Luna heads one faction, and Señor Sixto Zandueta, of Santo Tomás, is the leader of the other. Señor Zandueta was defeated at the last election for governor by Governor Luna.

Scouts.—There are no scouts in this province, but at Camp Wallace, near San Fernando, there is one squadron of the Tenth Cavalry.

Municipal police.—The municipal police, until November 15, 1906, were under the control of their respective presidentes, but on the recommendation of Governor Luna they were then placed under the control of the senior inspector. The improvement in the police force, both in appearance and efficiency, is marked, and on the recommendation of the senior inspector, approved by the provincial board, the municipalities have increased the pay of the police force, with the result that an intelligent force is now doing duty and cooperating with the constabulary in a manner that is extremely gratifying. The interest that the provincial governor has shown in the constabulary and in our efforts to raise the standard of the municipal police is very encouraging, and the zeal with which he keeps after the municipalities toward a successful prosecution of criminals, by his constant visits to those places requiring his advice, speaks volumes for the present peaceful conditions prevailing.

LEPANTO-BONTOC

The peace condition between the many rancherias is exceptionally good. Igorots to the south and southeast from Banaue (Nueva Vizcaya), Barling, and Lias, come all the way through the province to Cervantes, or for that matter go clear through to Candon, to do their trading, and from the north they come as far as Bangad and Mabuntot for the same purpose—this without soldier protection. Ilocano merchants come in scores over the new Tagudin-Cervantes trail and have gone as far as Lubuagan, bringing in their wares for sale or trade. Of course from Bontoc to Lubuagan these merchants accompany the constabulary patrol, but even so, it is something they would not have done two years ago and not for love or money, even with a strong guard, four years ago. Many merchants go in from the Abra side through Balbalasan to Lubuagan without any protection whatever.

Expeditions have been made to Barling, Lias, Bangayao, and Mayayao, Isabela, also to Nanon and Tabuc. Patrols are made semimonthly from Bontoc and Lubuagan, meeting at the rancheria of Butbut and weekly from Bontoc to the top of Polis Mountain, meeting the patrols from Banaue, Nueva Vizcaya.

During the past year the province has made great progress in road and trail building. The Tagudin-Cervantes road, though not completed, is open to traffic, and will no doubt prove of inestimable value. It is doubtful if the work of road or trail building could have made any material progress without the aid of the constabulary. Not through any fault of the supervisor, but lack of help—the right kind of help—Igorots with some authority. The province is in a majority of cases furnished an American foreman who has been assisted

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by a noncommissioned officer and six constabulary soldiers, and in many cases the constabulary alone have looked after repairs to trails and bridges. Consequently the trails are in fairly good condition.

The trails from Bontoc to Lubuagan, 52 miles, and from Lubuagan to Balbalasan, 24 miles, have been repaired with the constabulary assistance. Also a new trail from Lubuagan to Mabuntot, a distance of 6 miles, and one now under construction from Lubuagan to Lubo, a distance of about 30 miles, half of which is completed.

Any temporary slides, washouts, etc., to the trails are always looked after and repaired by the constabulary. Camarines or resting houses have been constructed under constabulary supervision at Sadanga Danu, Tinglayan, and Bangad. These camarines are an absolute necessity, especially during the rainy season, when travelers or patrols are caught in a baguio between the rancherias and unable to cross the rivers.

Some six or seven miners are at work at Mancayan and Suyoc, mostly doing their assessment work. The old Balbas copper-mine workings at Mancayan have been cleaned out and retimbered where same was necessary. In doing this thousands of tons of valuable copper ore have been deposited on the dumps ready for smelter. A copper placer claim taken up below the large copper mines has been worked. The copper ore (float) has been piled up on the sides of the creek, so as to not be washed away by heavy floods. Several thousand feet of cross-cut tunneling have been driven, and more activity in the mining region can be seen to-day than ever before during American occupation. The gold properties at Suyoc are also being worked, especially so across the east fork of the Abra River at Dugong, where some valuable gold ore is being taken out and shipped to the States for smelting. The Igorots are always taking out more or less gold, both from the river and quartz.

A promoting company—the Lepanto Mining Company—has been incorporated, with such men as Mr. Wood, of Smith-Bell & Co., Doctor McDill, Mr. Wolfe, of Castle Brothers, and others, at the head of it. This company has bonded some 40 to 50 claims, agreeing to pay for same at the rate of $10,000 to $75,000 per claim in the three years' time. The company has secured from the Commission a franchise to build an automobile road from the coast to Mancayan. It is intended to run into Bangar, La Union. It is expected that work on this new road and on smelting, etc., will be begun before the end of 1908.

Religious and political.—The question of religion or politics is not a disturbing element with the Igorot. There are, however, several Episcopal missionaries located at Sagada and at Bontoc, and there is a movement on foot to establish Catholic missionaries there.

A sawmill is being operated by the Episcpoal missionary organization at Sagada, which will undoubtedly afford work to many of the Filipinos located in this locality, as well as enable other interested parties to avail themselves of the lumber that is not required for the erection of Episcopal buildings.

Scouts.—There are no scouts or other military organization in this province.

Municipal police.—The only semblance of police are located at Cervantes and Tagudin, the latter in the Amburayan district, recently belonging to Ilocos Sur. The police force of the latter town is fairly efficient, but is capable of doing better work. In the various rancherias they have policemen, or rather they are called "polistas," whose duty is practically confined to serving as messengers to the municipal authorities, or carrying letters from one rancheria to another, and securing forage for animals of officials passing through the province, or cargadores for the transportation of cargo.

MEDICAL ORGANIZATION.

The report of the district surgeon is herewith given in full:

BUREAU OF CONSTABULARY, MEDICAL DIVISION,
Vigan, Ilocos Sur, June 30, 1907.

THE ADJUTANT FOURTH CONSTABULARY DISTRICT,
Vigan, P. I.

SIR: In compliance with the verbal instructions of the district director, I have the honor to render the following report of the operations of the medical division of this district during the fiscal year ended June 30, 1907:

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PERSONNEL.

The personnel of the medical division consists of 2 medical officers, 1 sergeant, 1 corporal, and 9 privates, distributed as follows: One medical officer, 1 sergeant, and 2 privates at Vigan; 1 medical officer and 3 privates at Tuguegarao; 1 corporal and 1 private in Isabela; 1 private each in Lepanto-Bontoc, Cagayan, and La Union.

The personnel, both commissioned and enlisted, while sufficient heretofore, is sadly inadequate because of the addition of two subprovinces to the district and the increase in constabulary stations.

HOSPITALS.

There are two hospitals in the district—one at Vigan and one at Tuguegarao.

The Vigan Hospital occupies a small but well-adapted building, and the equipment, while not all that may be desired, is fair. A room is set aside for the treatment of insular and provincial employees.

The Tuguegarao Hospital is located in an old nipa building, which is neither sanitary nor comfortable. Unsuccessful attempts have been made to secure a better building for this hospital.

There were admitted to the Vigan Hospital 44 cases, as follows: Febrile diseases, 12; gastro-intestinal, 3; surgical, 12; venereal, 4; other ailments, 12; number of deaths, 0.

The Tuguegarao Hospital treated during the period from July 1, 1906, to May 31, 1907, 80 cases, as follows: Febrile diseases, 47; gastro-intestinal, 11; surgical, 4; venereal, 6; other ailments, 12; number of deaths, 0.

As may be seen from the above, the health of the command, on the whole, has been exceptionally good, though of course the figures do not show the large number of men treated who were not excused from duty.

The entire command was vaccinated during the past year, and all stations in the district, excepting Cervantes and Bontoc, were inspected by a medical officer.

RECOMMENDATIONS.

Owing to the large number of isolated constabulary stations in the district it is respectfully recommended that a medical officer be assigned in charge of the Vigan Hospital, so that the district surgeon may be foot loose and be able to proceed, without delay, to any station when necessary.

The recommendation of my predecessor—Captain Wheate—in the last annual report in connection with the training of men from each company in first aid, etc., is heartily concurred in.

Very respectfully, C. H. SOLL, *District Surgeon.*

CONCLUSION.

Cattle stealing.—There seems to be a belief throughout the district that where cattle stealing is done by individuals, and is not triable under act No. 1121, the punishment meted out does not fit the crime. Particularly is this so when a criminal charged with the crime of "hurto," on pleading guilty, as a rule receives the minimum punishment.

While cattle thieving is not so great a menace to society as the crime coming under the bandolerismo act, the injury to the small farmer is just as great. A great deal of dissatisfaction is caused from the fact that persons convicted of this crime, after serving their sentence, proceed to do the same thing over again. The abuse in this respect was so great in the province of Ilocos Norte that the matter was discussed seriously by the assembly of presidentes with a view to securing a remedy for the evil. Furthermore, another difficulty that seems not to have been adequately provided for is the tendency of many persons when arrested for cattle stealing to present the testimony that the animals found in their possession had not been turned over to the municipal authorities through ignorance or for some other reason. It would seem that act No. 1147 does not cover the cattle-registration question sufficiently to provide a punishment that will eliminate this abuse and impress the finder with the necessity of delivering strayed animals to the proper authorities with a reasonable degree of diligence.

Necessity for increased strength.—In view of the extent of territory to be covered and the necessity of American officers in charge of stations in non-Christian districts, I would respectfully recommend increasing the number of

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companies in this district to 14 instead of 11, making the authorized enlisted strength for the district 612 instead of 562, as at present—an increase of 50 and a corresponding increase of 6 officers.

If it is the desire to carry on our work among the non-Christians to a successful issue, it is suicidal to have a detachment of soldiers not commanded by an American officer at any station in Lepanto-Bontoc, or in the non-Christian districts of Cagayan, Isabela, or Ilocos Norte. The work of handling the many disputes and disposing of the many complaints which constantly present themselves to the officer commanding a constabulary detachment among the non-Christians is such that the ordinary soldier would be a dangerous man to regulate them, separated as he is so far from his immediate commander.

In the province the following towns or rancherias have constabulary stations: Cervantes, Bontoc, Lubuagan, Balbalasan, and Tagudin. Stations will very soon be established at Mangali and Tabuc, both in the new subprovince of Kalinga. None of these stations are capable of being reached from within one and a half to two days from the next nearest station, and from Bontoc, where the office of the senior inspector is located, to the stations of Mangali, Balbalasan, Tabuc, and Tagudin it is a distance of from three and a half to five days when the rivers are fordable, which is very uncertain during the rainy season.

It is therefore recommended that the following be authorized as the number of companies and the maximum enlisted strength of the different provinces of this district, this strength being considered the very lowest at which anything like satisfactory work can be done:

Cagayan:		Present authorized strength, 2 companies of 50 men each.
First company	45	
Second company	40	
Third company	40	
Total	125	
Ilocos Norte:		Present authorized strength, 1 company of 50 men.
First company	40	
Second company	40	
Total	80	
Ilocos Sur:		Present authorized strength, 3 companies of 50 men each.
First company	40	
Second company	40	
Third company	40	
Total	120	
Isabela:		Present authorized strength, 2 companies of 50 men each.
First company	45	
Second company	45	
Total	90	
La Union:		Same.
First company	50	
Lepanto-Bontoc:		Present authorized strength, 2 companies of 50 men each.
First company	45	
Second company	45	
Third company	45	
Total	135	
Summary:		
Fourteen companies	600	
Noncommissioned staff	12	
Grand total	612	

The above remarks I trust will not be construed as being pessimistic, or that the district is going backward. We can continue to do our work with the present strength, but I believe that with the opening up of the new non-Christian districts, our chances of doing so much and of taking such a large part in this work of development would be so great that I have stated conditions frankly, and recommended the above increase in strength that the successful accomplishment of results may be assured.

Very respectfully,

THOMAS I. MAIR,
District Director.

The EXECUTIVE INSPECTOR, BUREAU OF CONSTABULARY,
Manila, P. I.

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REPORT OF DISTRICT DIRECTOR, FIFTH DISTRICT.

FIFTH CONSTABULARY DISTRICT,
OFFICE OF DISTRICT INSPECTOR,
Zamboanga, P. I., June 30, 1907.

SIR: I have the honor to submit the following report of events, operations, general conditions, and progress in the fifth constabulary district during the fiscal year ended June 30, 1907:

The district comprises the provinces of Surigao and Misamis, and the Moro Province, which is subdivided into the following civil administrative districts: Cotabato, Davao, Lanao, Sulu Archipelago, and Zamboanga.

Col. W. S. Scott was district director until December, 1906, when he was relieved by Capt. Herman Hall, U. S. Army, inspector for constabulary. The latter was in turn relieved by the undersigned on June 1, last.

The following officers constitute the present field and staff at these headquarters: Maj. Peter Borseth, district director; First Lieut. R. A. Duckworth-Ford, district adjutant; Second Lieut. H. F. Alexander, district supply officer; Second Lieut. E. L. Dunsworth, assistant district supply officer.

The policy of the government of the Moro Province has been to utilize the constabulary to the utmost, and many civil positions of trust and importance have been filled by our officers, in addition to their other duties, with credit to themselves and satisfaction to the administration. Maj. E. W. Griffith, senior inspector, constabulary of Lanao, held the governorship of his district with considerable success, and should be assigned to the fifth district on his return from leave of absence. It is the present intention of the legislative council to reappoint him governor of Lanao, which is probably the most difficult district to handle in the entire province. Capt. Henry Gilsheuser is district secretary and municipal president of Cotabato, and several other officers hold the subordinate, but nevertheless important, positions of deputy governor, tribal ward justice, auxiliary justice of the peace, etc.

As heretofore, the work of the constabulary in this district is somewhat different from that in other parts of the archipelago, particularly in respect to the handling of the Moros and other pagan tribes, and the authorities have aimed to instill the first principles of just, sound, and economical government into the various tribes by gaining the good will and confidence of their headmen, by inducing the people to trade through the Moro exchanges, and by the influence of the tribal ward courts, rather than by more drastic and forcible measures.

PEACE CONDITIONS.

Peace conditions are generally good throughout the fifth district, with the single exception of Lanao, and they have steadily and materially improved in even that turbulent region during the past twelve months, due largely to the patience, tact, and perseverance of Governors Griffith and Palmer, and to the dogged and incessant work of the constabulary of that district, who have been almost continually in the field.

The governor and department commander (General Bliss) is gradually transferring the onus of maintaining peace more and more upon the shoulders of the constabulary; and even when active hostilities are afoot in Lanao, the military almost invariably act in support of the constabulary (if they take the field at all), and the latter have consistently borne the brunt of any opposition shown by the outlaws. For this reason the general-service company has recently been increased to 70 men—thereby reducing the strength of other companies in the district.

The Moro exchanges, or trading stations, of which a great number have been established, continue to flourish, and in some cases have shown handsome profits. They have tended to greatly increase the trade in such jungle products as almaciga, gutta-percha, rubber, and hemp to the vast material benefit of the interior tribes who have gained a remarkable confidence in the power of the American Government to protect them from the depredations of the more warlike Moros.

Sporadic slavery still obtains in some of the more remote and least explored regions, but is rapidly being suppressed; human sacrifice has practically become a thing of the past, and considerable check has been placed on the former despotic character of the sultans, dattos, hadjis, and other headmen.

In view of the friction that has lately appeared in San Francisco over the Japanese on the school question and other issues, it may be noted that there

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are a considerable number of able-bodied Japanese (probably 200 or more), resident in Zamboanga, who seem to carry on a thriving business as skilled laborers. Most of the building and carpentering work in Zamboanga is done by these people, and owing to their simple and economical mode of existence, as well as their energy, enterprise, and perseverence, they have succeeded in ousting both Americans and Filipinos from competition in their own special lines.

COTABATO.

Governor: Maj. C. C. Smith, Philippine Scouts.
Secretary: Capt. Henry Gilsheuser, Philippines Constabulary.
Senior inspector: Capt. Henry Gilsheuer, Philippines Contabulary.

The peace and tranquillity of this district are better at this date than they have been since American occupation. No organized band of outlaws is known to exist nor are any criminals at large. Two minor engagements with outlaws under Sultan sa-Dimabara occurred during the year, resulting in a loss of eight men to the outlaws, and none to the constabulary. Dimabara and his band have all since been either killed or captured.

Considerable field work has been done by the constabulary of Cotabato during the past year, with excellent results—particularly in the Buldoon region, which in part has been notoriously unsettled. While no actual demonstrations were made against the government, it was known that a bad element existed in that part of the country, and hitherto found it a secure retreat. No cedulas had ever been taken out, and the dattos were inclined to be dilatory in responding to requests of the authorities. Since Lieutenant Furlong's and Captain Johnson's expeditions (February 25 to May 3, 1907), however, conditions in Buldoon have vastly changed for the better. Every known criminal or outlaw has been accounted for, trails have been opened up, the country has been mapped, towns and barrios have been visited, and the headmen have been made to realize that further lawlessness will not be tolerated, and that they must mend their ways or forfeit their liberty.

The district of Cotabato covers an enormous territory, over which a single company of constabulary can not hope to exercise a very appreciable influence. This applies particularly to the Maridiago and Cabacan country, and the regions south of Lake Buluan, where the inhabitants are hardly aware of the existence of the American people.

Political and religious conditions are quiet.

DAVAO.

Governor, First Lieut. Allen Walker, Philippine Scouts; secretary, Mr. Orville Wood; senior inspector, First Lieut. W. J. Platka, acting.

This is one of the two great hemp-producing districts of Mindanao, and there are at present well over 40 American plantations scattered along the Gulf of Davao, from Tagun in the north to Banos in the south, beside those representing European and Filipino interests. The copra industry, while still in its infancy, is steadily increasing, and most of the hemp planters have adopted the plan of interplanting their hemp with cocoanut trees. There are considerable stretches of hard-wood timber—such as ebony, molave, and ipil—which have been hitherto unexploited, and will require a large amount of capital, enterprise, and energy in its development.

The labor question is very important and will require careful study and handling in the future. The wild hill men are gradually being induced to come down to the coast settlements and plantations, and have proved the best laborers the planters have been able to obtain. The planters have organized themselves into a society called The Davao Planters' Association, for the "consideration and regulation of questions affecting the interests of the planters."

There are two small bands of marauders at large on the east coast. In the vicinity of Mati is a small band of Mandayas, led by Gadis, who occasionally descend from their mountain retreats to commit depredations on the coast; while near Cateel there is a band of outlaws, led by Louis Badudao and his son, which has perpetrated two atrocious massacres since March of last year. So far these outlaws have baffled all efforts of the constabulary to bring them to justice, and our difficulties are increased by the fact that the very people preyed upon will lend us no assistance or give us no information that might lead to their capture.

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There are a number of Jesuit missionaries in Davao district who apparently sometimes show greater zeal than discretion in the pursuit of their calling. The senior inspector writes:

"Their opposition to the public schools from the pulpit, in public, and in private does the district an injury, and in some towns they have succeeded in closing the schools entirely. * * * They threaten to excommunicate the family of any native who permits his children to attend the public schools; and they furthermore characterize the Americans as anarchists and heretics. * * * Hell fire and eternal damnation is gratuitously promised those who have tracts or other Protestant literature in their possession."

The work of the constabulary is of course guided by the policy of the district governor. The majority of the inhabitants are wild pagans, of a low order of intelligence. They appear to realize intuitively, however, that the Americans wish to give them "a square deal" and are as quick to appreciate justice as they are to resent injustice.

The American colonists are earnest, progressive, and very enterprising, and the district will ultimately develop into a prosperous, wealthy, and important one.

LANAO.

Governor, Capt. J. McA. Palmer, U. S. Army; secretary, Mr. Allan Gard; senior inspector, Capt. William Green, acting.

This district stretches through the heart of Mindanao, from Iligan Bay in the north to Iliana Bay in the south, embracing vast stretches of magnificent agricultural and grazing lands as well as immense forests of hard wood. Coffee, gutta-percha, and rubber grow wild in the interior, and an excellent quality of hemp is grown along the north coast. Cacao and copra are also produced.

It contains, however, the most turbulent Moro element in the island of Mindanao, and in spite of frequent punishment meted out by the constabulary to many recalcitrant dattos and their followings there are still a number of outlaws at large on the east side of Lake Lanao.

Ampunagous, of Malungan, district of Taraca, is the leader of a band of outlaws which infests the region between Romain and Maciu. These people are not given to pillage or other very serious crimes, but they continue to defy the American Government, and prey upon the more peaceful inhabitants for subsistence. This particular band numbers from 30 to 50 men, and they have about 12 Krag rifles.

On June 4 last Lieut. Leonard Furlong inflicted a severe punishment on a number of the followers of Nural Hakim in the Taraca Valley. In this engagement the constabulary loss was 2 killed and 3 wounded, while the Moros lost 17 killed. The cotta was taken by assault, the fighting being of a fierce, hand-to-hand nature, and the result reflects great credit on Lieutenant Furlong and his command.

On June 19 Lieutenant Furlong again encountered a body of outlaws under the notorious Ampunagous at Didaugun, and again routed them with a loss of 14 killed. The constabulary loss was 1 corporal severely wounded.

In these two engagements the following arms were captured: One Winchester carbine, 2 Remington rifles, 7 Tower muskets, 1 revolver, and a number of blade weapons. With the exception of this Taraca region the peace conditions may be regarded as satisfactory and are steadily improving under the rigid and energetic policy of Governor Palmer, which allows the outlaw element no rest, and there is little reason to doubt that the finish of this renegade opposition to progress, law, and order is within sight. However, the operations of Lieutenant Furlong have developed indications of a hostility, which may ultimately necessitate a call upon the military forces, to achieve this end.

MISAMIS.

Governor, Señor Apolinar Velez; senior inspector, Capt. G. D. Long.

This province has not suffered from any disturbances other than religious and political throughout the year. The only outlaw known to be at large is the old offender Baludong, who has successfully evaded the constabulary for several years. It is probable that the Montescos living far back in the mountainous interior still possess a few Remington rifles, which will eventually come in, as three such rifles have been taken up this year (1907). Crime is comparatively rare, and even carabao stealing is practically unknown, except among the Montescos and the people of Camiguing Island.

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Political and religious questions, however, while they have occasioned no serious disturbances, constitute a sore spot in the province. The expediency of bringing Misamis within the jurisdiction of the government of the Moro Province has been mooted from time to time and has furnished a favorite theme for political orators, who abound in all of the more important towns. Antipathy for the established government obtains and is thinly or not at all veiled.

The province is torn with religious differences, but no serious clashes have occurred. On the whole the Aglipayanos predominate, though the Catholics claim they are slowly but surely recovering their former influence and following.

The first company of this province has had but few encounters with outlaws of minor significance, and there has been no real opposition to the authorities on the part of organized bands.

A large majority of the Filipino residents are ignorant and docile, completely led and influenced by their leaders, of which there are a few in each municipality or barrio.

Mambajao, on the island of Camiguin, is a very progressive municipality of the first class, well governed by municipal officials selected for their public interest. The island is rich in cocoanuts and hemp, and almost all the available land is under cultivation.

It appears that one Ramon Coronel, agitator and confidence man, was deported by Judge Wislizenus, of the court of first instance at Bacolod, Negros. To deport a criminal from the haunts where he is known, where the people by that very knowledge can be on their guard, and allow him to take residence in another district where he is unknown, can only do added harm.

SULU.

Governor, Col. E. Z. Steever; senior inspector, Capt. F. S. De Witt.

Peace conditions in this district are very satisfactory. Generally speaking, the people, who are busily occupied with their own affairs, such as farming, fishing, pearl fishing, boat building, etc., seem to be content with the American system of government as applied to themselves. The extent of land under cultivation has been considerably increased during the past year. Among the principal products may be mentioned hemp, cocoanuts, rice, tapioca, oranges, lemons, camotes, peanuts, pineapples, and the ubiquitous banana. Most of the taxes, except the cedula, have been promptly paid, and it is anticipated that the revenues will show an increase over that of last year. The cedula tax has not been collected, because no systematic effort has ever been made to force payment, and the Moros have not yet accustomed themselves to make voluntary payments.

There are no organized bands of ladrones in the district, there have been no serious encounters with outlaws during the past year, and crime has been reduced to a minimum. Only 6 murders are on record as having occurred, and in every case the murderers were promptly apprehended and turned over to the proper authorities for trial.

Having no political parties, religious and political conditions may be regarded as excellent. Much of the time of the senior inspector (as governor's representative) is spent in settling disputes, factional fights, etc., and performing the duties of municipal president and justice of the peace at Siasi.

SURIGAO.

Governor, Señor Rafael Elliott; senior inspector, Capt. Ole Waloe.

This province has been in an absolute state of tranquillity during the entire year. No organized band of outlaws exists nor are any bad criminals known to be at large. Only three murders have been committed so far as known during the past twelve months, and all of the perpetrators were arrested by the constabulary and are now serving sentence in Bilibid.

Politics and religious questions are quiet and normal. There are no irresponsible agitators on the stump, and the people have therefore not yet been disturbed by illusory visions of Utopian prosperity and magnificence, to be brought about by "immediate independence." In fact, the question of who owns the finest hemp plantation or the greatest number of cocoanut trees creates more interest and discussion than do all of the politics of the province and the archipelago combined.

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From a religious standpoint, the Roman Catholic Church dominates the province. The Aglipayanos are represented by only 3 young priests, stationed at Cabadbaran, Dapa, and Loreto. In nearly all other towns the independent churches erected about three years ago have been allowed to fall into ruin, and the movement generally seems to have died out.

No uprisings have occurred during the year. The nearest thing to an engagement occurred in the month of August last year, when Subinspector Zapanta and 5 men were shot at with bows and arrows while in pursuit of a murderer in the mountains between San Juan and Veruela. One of the outlaws was killed, 1 was wounded, and 5 were captured, including the murderer.

ZAMBOANGA.

Governor, Capt. John R. Finley, U. S. Army; secretary, Mr. J. M. Browne; senior inspector, First Lieut. R. A. Duckworth-Ford, acting.

This district includes the peninsula of Zamboanga, the former district of Dapitan, the Island of Basilan, and over 100 small islands in the vicinity of the mainland of Basilan.

Not only the district government, but the government of the Moro Province, and headquarters, Department of Mindanao, are located in Zamboanga, the capital, which is situated at the extreme south of the peninsula. It is a clean, well managed, most picturesque little city, with a most promising future before it.

The following is a list of the more important government officials whose offices are located in Zamboanga: Brig. Gen. Tasker H. Bliss, department commander and provincial governor; John E. Springer, judge of court of first instance; R. M. Campbell, prosecuting attorney; Fred A. Thompson, provincial treasurer; Charles R. Cameron, superintendent of schools; George H. Bennett, collector of customs; Capt. J. P. Jervey, provincial secretary and provincial engineer.

There are two companies of constabulary—the first being now on detached service at Davao, its place being taken at Calarian prison by the second company, constabulary of Davao, under Capt. Waldo B. Williams, who is also warden of the prison.

Peace conditions in this district are excellent and the people have never been more tranquil or contented. Under the policy that obtains much of the police work of the district is performed by the headmen of the various tribes, who are vested with police powers within their tribes, and act under the immediate direction of the district governor. It has been his aim to patiently accustom the people to this system of government, who with the gradual spread of prosperity and enlightenment among them are gradually but surely reposing greater confidence in the friendly intentions of the Americans, and in their power to give them protection, and administer justice. The only parts of the district which can be said to be without the pale of civilization and the reach of law are the interior of Basilan, and the region occupied by the Kalibuganes and Subanos, in the northern interior.

The Moro Fair, held in Zamboanga, February 12 to 15 inclusive, proved a great success, and attracted a considerable number of people from other provinces and Manila, as well as from the outlying parts of Mindanao. Representatives from all of the pagan tribes were brought in, and there is no doubt but that their eyes were opened as they never were before to the vast power and unlimited resources of the American people. The exhibits included articles manufactured in the province, farm products, live stock, etc., together with a practical demonstration of the latest agricultural machinery, hemp stripping machines, and so forth.

First Lieut. R. A. Duckworth-Ford took over the duties of district adjutant at the beginning of November last year, vice Maj. John R. White, detached with the bureau of prisons. Lieutenant Ford has, by virtue of his office, taken charge of all the routine work of these headquarters, during the various absences of the district director, while on tours of inspection, etc. He has also been acting senior inspector of the constabulary of Zamboanga since December, 1906, as it was found expedient to consolidate the duties of senior inspector of Zamboanga with that of the district adjutant. This has resulted in a most desirable curtailment of correspondence, an improvement and concentration in the system of records, and an economy of administration, and has done away with a considerable amount of red tape and circumlocution.

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Political and religious questions, howev
serious disturbances, constitute a sore sp
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Province has been mooted from time to
theme for political orators, who abound
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The province is torn with religious d
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The first company of this province
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Governor, Col. E. Z. Steever; s

Peace conditions in this distri
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system of government as appl
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There are no organized ba
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proper authorities for trial.

Having no political parties,
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Governor, Señor Rafael El

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Politics and religious que
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director. Maj. E. W. Griffith relieved as senior in-
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F. Johnson relieved as acting senior inspector, constabu-
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27.—Lieut. J. N. Merrill, with 19 constabulary, accompanied by a
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he latter died May 5, and was buried at Keithley with full military
ne other private slightly wounded in this engagement.
—Capt. Herman Hall relieved as fifth district director.
—Maj. Peter Borseth, district director, assumes command of the

—Lieut. Leonard Furlong, with Lieutenant Tarbell and a mixed com-
bout 60 men attacked cotta occupied by the followers of Nural Hakim

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GENERAL SERVICE COMPANY.

The general service company, with a strength of 70 men, is under the command of Capt. Frederick Johnson, and constitutes the reserve of the fifth district constabulary. At the beginning of the fiscal year 1907 it was stationed in Bongao, where the company had temporarily relieved the first Sulu, ordered to Zamboanga for recruiting and other purposes. During this period the Tawi-Tawi Island Group was thoroughly patrolled by the constabulary, traveling afoot or in small vintas, and covering over 600 miles in two months. A successful expedition was made to Tandubaas for the capture of an outlaw. The company returned to Zamboanga, August 8, 1906. While stationed here it has performed the usual garrison duties. Detachments of the company have rendered effective field service during the past six months against the outlaws of Basilan, district of Zamboanga, and in Lanao, Cotabato, the northern interior of Zamboanga, and in Misamis. A total of nearly 3,000 miles has been covered by the company or its detachments during the year.

SUMMARY OF SPECIAL EVENTS, UPRISINGS, ENGAGEMENTS, ETC.

July 1, 1906.—General Allen arrived in Zamboanga, and made a tour of the southern part of the district.

July 8.—Fifteen people brutally massacred at Alujud, a barrio of Cateel, district of Davao, by a band of outlaws under Badudao. These outlaws are still at large.

July 9.—Lieut. Leonard Furlong accompanied Major Boyd on an expedition to the Buldoon region, Cotabato, and had a successful engagement with outlaw Moros under Sultan sa-Dimabara, near the town of Bugasan—6 outlaws killed.

August 1.—Agricultural fair held at Cotabato.

August 3.—Lieut. James L. Wood took a field party to Pitturungan, Lanao, to arrest Moros Dumamba and Sincara, who wounded an American sentinel at Marahui, June 27, 1906. These 2 men with 3 others captured.

August 8.—Lieut. Jas. L. Wood arrested Pitilan, sultan of Lumbayao, for harboring criminals.

August 9.—Lieut. J. L. Wood led a field party in an attempt to secure Umama, a Moro outlaw who assaulted an American sentinel at Marahui, June 27, 1906. The man's house was surrounded, but most of the occupants effected their escape. One man, Umama's uncle, was killed.

August 14.—Lieutenant Wood, with 14 constabulary, arrested Alungu, charged with illegal possession of a Krag rifle. This rifle was recovered August 18 and turned over to the military authorities, by whom it had been lost in an early campaign.

August 17.—Expedition by Lieut. J. L. Wood, with 11 men, to Paulas, Lanao. Datto Paulus arrested, and 1 Remington rifle and 1 revolver, caliber .38, captured in his house.

August 28–29.—Lieut. J. L. Wood conducted an expedition to Uato, Lanao, and reports that most of the Moro brass ware, krises, kampilans, etc., used in Lanao are made in Tugaya. Lieutenant Wood describes process of manufacture in detail. Says much gunpowder is also made, but it is of very inferior quality. One muzzle-loading gun was captured.

August 29.—Anti-Catholic play presented at Baliango, Misamis. Later Capt. Herman Hall was ordered to investigate the trouble, by the Governor-General, with the result that a temporary substation was established at Oroquieta, Misamis, during the months of November and December.

August 31.—Lieutenants Wood and Bell made an expedition to Basag (Dulangan), Lanao, with 60 constabulary. Macadar Datto Grande, Alangan, and his 2 sons were arrested and 1 Krag rifle captured.

September 2 and 3.—Lieutenants Wood and Bell, with 58 constabulary, made an expedition to Bundi. Moro Bagambang was arrested and 2 Krag rifles and 215 rounds of ammunition taken. At Calasangan 1 Remington rifle and 45 rounds of ammunition were captured from the sultan of that place. Since this expedition conditions have materially improved, and things may now be considered normal in this vicinity.

September 5–7.—Capt. Henry Gilsheuser made an expedition from Parang-Parang to Bugasan to obtain information of and locate Sultan sa-Dimabara and other renegade Moros, to find a suitble Moro for appointment as headman, and

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to look into the commercial, industrial, and productive possibilities of the country, the establishment of markets, and the conditions of the people in general. This expedition was generally successful.

September 16.—Capt. Herman Hall arrived in Zamboanga and assigned as assistant district director.

October 15.—Agricultural fair held at Jolo. Lieutenant Duckworth-Ford arrived in district and assigned as adjutant.

November 8.—Col. W. S. Scott relieved as district director. Captain Hall assigned as acting district director. Maj. E. W. Griffith relieved as senior inspector and governor, district of Lanao, to enable him to go on leave of absence. Capt. John McA. Palmer, U. S. Army, appointed governor, and Capt. William Green appointed acting senior inspector, Lanao.

December 10.—Capt. F. Johnson relieved as acting senior inspector, constabulary of Zamboanga, and ordered to Misamis on detached service. Lieut. R. A. Duckworth-Ford assigned as acting senior inspector, Zamboanga.

December 13.—Lieut. J. O. Bell while leading a reconnoitering party in the Maciu region of Lanao, attacked by a party of hostile Moros. Lieutenant Bell received a gunshot wound in hand; one private also wounded.

January, 1907.—Magumpara, a Maciu Moro of some influence, was induced to come in, and presented a Krag rifle and a Krag carbine.

January 7–18.—Lieutenant Furlong, with 16 men, accompanied Captain Foster and detachment of Nineteenth Infantry through Barrera, Buldoon, and Butig regions of Cotabato, with the object of arresting the murderers of Patrick Burns, and to arrest Sultan sa-Dimabara and other renegades for their part in the murder of Private Macdonald. On January 16 Lieutenant Furlong captured a man calling himself Cabugatan, suspected to be Dimabara. This man, together with another prisoner, was sent to Malabang under guard, January 20, 1907, and both turned over to Captain Foster.

January 29.—Lieutenant Wood surprised a camp of hostile Maciu Moros and captured 4 muskets and a few prisoners.

January 31.—Capt. Waldo B. Williams relieved as senior inspector, constabulary of Davao.

February 1.—Lieutenant Ford and 15 men, general service company, accompanied Governor Finley to Curuan, Zamboanga, the inhabitants of which locality had been terrorized by a small band of Joloano Moros, who had landed in the vicinity. The latter escaped in their boats before the arrival of the constabulary.

February 14.—Capt. Wm. Green, with Lieutenant Merrill and 35 constabulary, surprised a hostile camp at Apa, killing 6 Moros, and capturing a number of krises and campilans.

February 27.—Lieut. J. N. Merrill, with 19 constabulary, accompanied by a military mapping party, made an expedition through the Puno-Maciu country. Captured 1 Tower musket, and later captured another, together with 1,000 rounds of Krag ammunition.

March.—During this month 5 Krag rifles were presented by Moros of the Maciu district, owing undoubtedly to the aggressive attitude of the constabulary and the district governor.

March 2.—Lieut. J. N. Merrill led an attack on the cottas occupied by Sultan Dilumbayan, and the double cotta held by Sultan Uali Ulama, of Maguing, Puno Maciu. Both attacks were successful. Nineteen Moros, including both of the leaders, were killed. In the second assault Lieutenant Merrill was severely wounded in the knee, with a kris in the hands of Sultan Uali Ulama, whom he shot and killed. For his gallantry on this occasion Lieutenant Merrill was specially mentioned in General Orders. One Tower musket and a number of blade weapons captured.

March 4.—Capt. Herman Hall relieved as acting district director, and appointed district director.

April 28.—Expedition by Capt. Wm. Green and Lieut. J. L. Wood against Lanao Moros, near Marahui. Lieutenant Wood received gunshot wound in left thigh; not serious. Private Guimba received two gunshot wounds in leg, both serious. The latter died May 5, and was buried at Keithley with full military honors. One other private slightly wounded in this engagement.

May 31.—Capt. Herman Hall relieved as fifth district director.

June 1.—Maj. Peter Borseth, district director, assumes command of the district.

June 4.—Lieut. Leonard Furlong, with Lieutenant Tarbell and a mixed command of about 60 men attacked cotta occupied by the followers of Nural Hakim

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and Ampunagous (Lanao), with success. Nineteen outlaws killed and 7 guns captured; 2 constabulary killed and 3 wounded.

June 19.—Lieutenant Furlong, with Lieutenant Wood and 53 constabulary, encountered the renegade Ampunagous at Didaugun, with the result that 14 Moros were killed and the remainder routed. Corporal Gumayog of the constabulary was severely wounded. The following arms were captured from the outlaws—one Winchester carbine, 2 Tower muskets, 1 revolver, and a number of blade weapons.

MUNICIPAL POLICE.

Zamboanga.—The police of the city of Zamboanga have noticeably improved in efficiency during the past twelve months, but there still remains plenty of room for improvement. A competent and energetic American chief is essential, if they are to be brought to such a standard of efficiency as a capital and port so progressive and commercially important as Zamboanga has a right to expect. They are under the direct control of the municipal president and council and are not inspected by the constabulary.

Davao.—None of the municipalities of this district, of which there are five, make more than a pretense of maintaining a police force. The town of Davao has 3 policemen armed with Remington shotguns, who are employed mainly to guard prisoners doing night work; otherwise they are useless. Lieut. J. R. Youngblood has recently been appointed chief of police of Davao, and the force is shortly to be increased to a strength of 1 lieutenant and 6 men. In addition, however, there is a district police force of 25 men, who have proved themselves really valuable in running criminals to earth.

Catabato.—The municipal police of this district are generally efficient, are suitably armed and uniformed, and perform their duties well. They have been inspected at various times during the past year, and have never failed to make a creditable showing. Their principal duties consist in guarding prisoners and enforcing municipal ordinances, but at times they have been successful in making arrests for the more serious crimes committed outside of the limits of their municipalities.

Sulu.—The municipal police of Siasi consist of 3 patrolmen, armed with blade weapons. They are of no practical benefit, and would be useless in case of serious trouble in the town. They have been inspected frequently during the past year. The police of Jolo consist of 1 sergeant, 1 corporal, and 12 patrolmen. They are not inspected by the constabulary.

Surigao.—There are 12 municipalities in this province, the combined police force of which is made up of 9 sergeants, 10 corporals, and 37 patrolmen, who are all armed with bolos and clubs. They are poorly uniformed and paid, and are somewhat lacking in discipline, though they are willing and loyal. Some effort has been made by the senior inspector and others to bring the police to a higher and more efficient standard, but the leanness of most of the municipal exchequers has made this difficult of accomplishment. Generally speaking the police are drawn from a poor type of men, who are constantly being changed for new recruits of the same class. The policy of the senior inspector has been to endeavor to create a spirit of emulation and rivalry between the police corps of the various towns rather than to criticise them.

Misamis.—In this province there are 8 sergeants, 12 corporals, and 112 patrolmen, constituting the entire force of municipal police. Their efficiency varies considerable in the different towns. At Oroquieta, for instance, they are very good, while at Initao they are poor. Rated generally they may be classed as fair and improving. The police throughout the province are well uniformed and a number of them are armed with revolvers, Remington rifles, or Remington shotguns, while others are armed with clubs and blade weapons.

PERMANENT BUILDINGS.

The new district headquarters building, which has been under construction during the past year, has now been completed and is ready for occupation. The total cost of the same amounts to about ₱44,000, but so far no arrangements have been made for stables, wagon sheds, carpenter shop, stablemen's quarters, or for a sick ward or dispensary; nor has there been any allotment for fencing, filling in, and other necessary improvements on the reservation. The inspections and supervision of construction of the new building have been attended to by Capt. J. P. Jervey, engineer of the Moro Province, and his assistants.

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There have been taken up the following buildings, which formerly belonged to the Spanish Government, but which are now occupied by the constabulary in this district:

	Description.	Approximate value.
Tucuran	One stone building	₱1,000
	do	2,000
	do	2,000
	One frame building	2,000
Siasi	One building, one story stone, with wood and iron roofing	8,000
	One building connected with above, stone, nipa roofing	2,000
Bongao	Three stone buildings with iron roofing	3,000
Cotabato	One building, frame, iron roofing	2,000
Davao	One building, nipa sides and roof, pine floor	1,500
	One building, wood	500
Mati	One building, nipa roof	2,500
	One building, nipa roof, board floor	1,500
	One building, wood and cogon, hard-wood floor	150

The cost of repairs on these buildings for the past year, including authorities now on file for expenditures of this nature, approximate ₱600. A considerable amount should be expended on these buildings during the fiscal year 1908 in order to put them in a proper state of repair.

It is also recommended that ₱500 be appropriated for the construction of a boathouse at Zamboanga. Boats from outlying stations are not infrequently sent here for repair. At the present time the district supply officer has 4 boats in Zamboanga without any proper shelter for them and in the event of heavy storms they are likely to break their moorings and suffer considerable damage.

The following additional buildings are required in connection with district headquarters and should be erected on the constabulary reservation at Magay, Zamboanga, with the least practicable delay: Wagon shed, stables for 10 horses, oil shed, and teamsters' quarters.

A detachment of about 15 men is all that is needed in Zamboanga for guard duty at district headquarters, general police, orderlies, etc. With this arrangement sufficient room will be available for all purposes.

TRANSPORTATION.

Transportation facilities have been only moderately good during the past year. A launch has been rented from the bureau of navigation, at ₱80 per day, which has been used almost exclusively by the district director in making his inspections of the district, and owing to the uncertainty of its movements little shipment of supplies has been made therein. Until the month of May this year, when it was sent to Manila for repairs and its place taken by the *Coron*, the launch *Rover* was employed at the same rate. The *Coron* is inferior to the *Rover* in seaworthiness, accommodation, and carrying capacity, and I recommend that it be recalled and that a more serviceable craft be furnished the district.

The steamship *Borneo*, which was subsidized by the government of the Moro Province, has been successfully operated between the ports of Dapitan, Misamis, Zamboanga; Zamboanga, Jolo, Siasi, and Bongao; and Zamboanga, Tucuran, Malabang, Cotabato, Mati, and Davao. The rates were exorbitant, and an additional charge of 20 per cent was collected on freight rates at ports without docking facilities. The *Borneo* has now been chartered by the military and taken off the run. To take its place *Butuan*, operated by the Compañia Maritima, has been subsidized by the provincial government, and the rates have been materially reduced.

The following scheme, suggested by Lieut. H. F. Alexander, district supply officer, is submitted for what it is worth:

That a regular coast-guard cutter be chartered by the constabulary and employed by the fifth district in the following manner: To make a trip to Manila once every two months for the purpose of obtaining funds and supplies, calling at Iloilo on the way north, and on its return voyage touching at Mindoro, Romblon, Masbate, Cebu, Tagbilaran (Bohol), Surigao, Cagayan, Iligan, and Dapitan.

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The next route would be: Zamboanga to Jolo, Siasi, Bongao, and Sitankay. The third route would be from Zamboanga to Tucuran, Malabang, Parang, Cotabato, Mati, Davao, and return to Zamboanga.

This schedule could of course be more or less modified at any time to meet the requirements of the moment.

Lieutenant Alexander assumes that the saving on transportation of supplies from Manila to Zamboanga and outstations, as well as to Masbate, Cebu, and other points above mentioned, plus collections from passengers, would fully compensate for the difference between the amount now paid for the launch *Coron*, and for that of a large, fast, and seaworthy cutter.

The undersigned is not, however, sufficiently familiar with all the needs and conditions of the district—owing to his recent arrival—to make any recommendations or suggestions of his own upon it. I am inclined to think the idea should be given some consideration, as there can be no question that the system of transportation obtaining in this district at present is as inefficient as it is unsatisfactory.

Sailboats, sapits, etc., have been supplied to all stations where needed.

Bull carts, handcarts, and wagons have also been furnished stations where in the discretion of the district director they are necessary.

The United States Quartermaster Department has been most liberal, and we have rarely been refused accommodation in the way of transportation of supplies when asked for.

ARMS AND EQUIPMENT.

There are at present 5 companies equipped with the new United States magazine carbines, remodeled, with bayonet. The first shipment of the new guns was received in the latter part of March last, and were promptly transshipped to the Cotabato and Lanao constabulary. The second, received in May, was furnished to the first company, constabulary of Misamis, stationed at Cagayan, the general service company at Zamboanga, and the second Davao company at Calarian prison. There is now on hand, awaiting shipment, a supply of new guns for the first Davao company at Mati. The ordnance officer, Manila, has informed the district ordnance officer that no more of the new carbines can be supplied before September next.

The remaining companies are still equipped with the Springfield carbines, the majority of which are considerably worn, and are constantly in need of spare parts. Otherwise all companies throughout the district are well equipped.

All requisitions for ordnance are made through the district adjutant and are, as far as possible, filled by the district ordnance officer, Lieutenant Dunsworth, the balance being requisitioned for from Manila.

Arms and equipment have been furnished certain municipal police in the district when properly authorized.

The only serviceable ordnance stores now on hand (not issued) are web belts, caliber .45; waist belts, revolver holsters, cartridge pouches, and revolvers—Colt, double-action, caliber .45. It is recommended that an ample supply of reserve ammunition, as well as spare parts for the new Krag-Jörgensen carbines, be furnished the district ordnance officer as promptly as possible.

There is some conflict of opinion among officers of this district as to whether or not enlisted men (and particularly the Moros) should be allowed to wear shoes when on field service. Captain Gilsheuser, of Cotabato, maintains that shoes are a needless impedimenta to a type of man who has gone without footgear from time immemorial, while Lieutenant Platka remarks: "The Filipino soldier should be issued shoes if for no other reason than the additional pride it leads him to take in himself and his appearance. We only cheapen our organization by compelling our men to go barefoot. To their minds we are forcing them back into the Tao class, stifling their ambition, and placing a restriction upon them which prevents their mingling with the better class of Filipinos."

The fez and puttees are considered far more serviceable than the cap and legging used by the constabulary of other districts. While the fez provides no shade for the eyes, it may be regarded as the national headgear of most Mohammedan peoples. It furnishes considerable protection against the rays of the sun, on account of its substantial material, is of healthful color, according to medical science, and is smart, soldierlike, and unique. The puttees have proved to be more durable than the canvas legging; they insure a maximum of neatness, as they fit any leg, and are to a large extent waterproof. Army offi-

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cers have frequently commented on the smart, soldierly appearance of our Moro constabulary, and have remarked on the fezes and puttees as being peculiarly suitable to this type of soldier. Several of our officers have suggested that they be authorized to discard the present khaki cap in favor of the fez, claiming that the thin khaki covering of the cap affords absolutely no protection to the top of the head against the sun's rays, which are very intense in this part of the archipelago. It may be remarked, incidentally, that British officers detailed to the Egyptian army wear the fez in common with the men. Many officers in this department have adopted the spiral puttee in lieu of the leather legging.

MEDICAL ORGANIZATION.

In January of the present year the district hospital in Zamboanga was done away with, and Capt. Albert Butler, the district surgeon, was transferred to the third district. Since that time the constabulary of Zamboanga and Sulu have had to depend on the military for medical and surgical service, and enlisted men suffering from any serious complaints in these two districts are admitted to and treated in the military hospitals at Zamboanga or Jolo.

Under normal conditions this system seems to be fairly satisfactory; but should an epidemic of cholera, smallpox, or other serious disease break out among the men, the lack of a constabulary surgeon at district headquarters would undoubtedly occasion considerable inconvenience, particularly now that the new building is completed. The enlisted men's barracks are located on the ground floor of this building, on the opposite side of the hallway to the district supply officer's storerooms and office; and in the event of a serious epidemic there can be no doubt but that all officers or clerks residing or employed within the building would be quarantined by the sanitary officer within the building. This would seriously incommode the transaction of official business and would involve no slight inconvenience to officers and employees for an indefinite period. Moreover, the new building is about a mile farther from the hospital than are the present barracks, so that under existing arrangements the sick would be required to walk a total distance of nearly 4 miles each morning in order to recive proper attention.

I am of the opinion that a small ward and dispensary should be erected within the reservation, but as far removed as possible from headquarters building, and placed in charge of a qualified medical inspector or, if this is impracticable, of an experienced sergeant of the medical division.

In Cotabato sick men are treated by the military surgeons. No personal compensation is paid for these services, the only charges being the regular hospital fees and the cost of medicines prescribed and furnished.

Capt. E. W. Ames, surgeon, Philippine Constabulary, has a small ward in a good building in the town of Davao, and looks after that entire district. He visits the constabulary garrisons on the east coast once every month, the remainder of his time being put in at Davao, where there are many calls upon his time and services. This officer, I believe, does a considerable amount of gratuitous work among indigent Filipinos and the wild tribes of the district.

First Lieut. C. E. Laws, M. D., Philippine Constabulary, is stationed at Cagayan, Misamis, where he has a small dispensary. All of the stations on the northern coast of Mindanao are under his medical care and supervision.

PHILIPPINE SCOUTS.

There is no regular cooperation between the constabulary and scouts in this district. The seventh battalion of Philippine Scouts, consisting of the Eighth, Ninth, Tenth, Eleventh, Forty-second, and Forty-fifth companies, under the command of Maj. C. C. Smith (captain, Fourteenth Cavalry, and district governor), are on duty in the district of Cotabato. The stations are Cotabato (headquarters), Pikit, Kudurangan, Reina Regente, and Parang-Parang.

The Forty-fifth Company was stationed in the district of Davao from July, 1906, until May 3, 1907, when it was transferred to Parang.

Other scout companies within the district are as follows:

Fortieth Company, Camp Overton, Lanao, and the Fiftieth Company at Margosa-Tubig, district of Zamboanga.

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RECOMMENDATIONS AND CONCLUSION.

Another general-service company of 50 men is very necessary in this district, owing to the unprecedented amount of difficult fieldwork which has been called for in Lanao district. The headquarters of this company should be at Isabela de Basilan, where splendid quarters are available in the old Spanish fort on top of the hill overlooking the river and harbor. The effect on the people of Basilan would assuredly be beneficial, as the presence of the company would lend confidence to the loyal and would check the smoldering disaffection of the more lawless element who, as a matter of fact, constitute a considerable proportion of the population of this unexploited and little known island. Nothing definitely is known apparently as to the number of guns out in this island, but it is rumored that there is a large number.

While mistakes and errors of judgment have been made occasionally, officers of this district have as a general rule labored conscientiously and efficiently in the interests of the government, the people, and the service, and results have been exceedingly satisfactory. Senior inspectors and company officers have alike displayed a laudable interest in the enlisted men under their respective commands, both in regard to their personal welfare, comfort, and recreation and in respect to their instruction and training—military, civil, and scholastic.

A marked friendly feeling continues to obtain between army officers and ourselves, and most of our officers stationed in Zamboanga or the vicinity are auxiliary members of the Army and Navy Club.

The general-service company stationed in Zamboanga has in the past been tied to that station, as its duties in a great part have consisted in furnishing guard for headquarters, guards for working parties of provincial prisoners, and police duty. This company will be relieved from all duty as soon as another detachment is available, and will be exclusively used for field duty, as intended when organized. When not in the field the general-service company will be stationed in Isabela de Basilan, where the constabulary has excellent barracks.

Attention is invited to my letter to the executive inspector dated June 28, 1907, recommending an increase of the constabulary of the fifth district by 4 companies.[a]

Respectfully submitted.

PETER BORSETH,
District Director.

To the EXECUTIVE INSPECTOR, BUREAU OF CONSTABULARY,
Manila, P. I.

REPORT OF SUPERINTENDENT, CONSTABULARY SCHOOL.

BUREAU OF CONSTABULARY, CONSTABULARY SCHOOL,
OFFICE OF THE SUPERINTENDENT,
Manila, P. I., July 22, 1907.

SIR: I have the honor to submit the following report of the constabulary school for the year ended June 30, 1907. The course adopted by the school staff for the instruction of student officers and enlisted students the past year included the following subjects:

For student officers: Small-arms firing regulations, including a course in gallery practice; infantry drill regulations, theoretical and practical, to include school of the company and battalion parade; manual of guard duty, theoretical and practical; equitation, theoretical and practical; fencing with saber, foil, and bolo; gymnastics and calisthenics; Spanish and Tagalog languages (primary), for all except Filipino student officers; (instruction in English for Filipino student officers was introduced during the term January to May, 1907); constabulary orders and regulations; constitutional law; McKinley's instructions to the Phillipine Commission; municipal and provincial code; acts of the

[a] A number of tables showing the following information have been omitted and are on file in the Bureau of Insular Affairs, War Department: Roster of officers and stations; work accomplished; strength and efficiency of municipal police; and distribution of constabulary force in the district.

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Commission affecting the constabulary; penal code with lectures on criminal law, evidence, and procedure; law of arrests; miscellaneous lectures on selected subjects by heads of bureaus; typography and map reading; lectures by medical officers on diseases, first aid to wounded, sanitation, and hygiene.

For enlisted students: Small-arms firing regulations; infantry drill regulations, theoretical and practical; manual of guard duty; bolo fencing; gymnastics and calisthenics; constabulary orders and regulations pertaining to enlisted men; company records and correspondence; arithmetic, geography, reading, and composition in primary English.

The student officers and enlisted students were given ten days' field work in December and three days in May. The period of field instruction for the term ending May 31 was curtailed on account of the early graduation of the student officers.

The organizations on duty at the school during the past year were a class of student officers from July 1 to December 31, 1906, and a class of student officers from January 1 to May 31, 1907. The total number of officers instructed in these two classes being 42.

Three different companies of enlisted students were under instruction during the year, the total number of enlisted men instructed being 168, of whom 107 qualified.

These companies, while undergoing the usual instruction generally given to organizations, have been employed as guards at the school at constabulary headquarters, and over the powder magazine at San Juan del Monte; as escorts to prisoners from Bilibid to the penal colony at Iwahig and various points in the provinces, and to a considerable extent over laboring prisoners in the city of Manila.

They have received no target practice, no range being available. All of the companies have suffered more or less on account of not having permanent and efficient company commanders the past year. It was found necessary from time to time to detail with them student officers for duty, who as a rule were lacking not only in experience but also in enthusiasm, as this company work could be nothing more than temporary duty, performed during the time they were engaged in hard study.

General Orders, No. 26, bureau of constabulary, series 1907, changed the enlisted personnel at the school, and attached the enlisted students to the companies stationed here. This makes it necessary that each of these companies have assigned to them an experienced company commander of tact and ability, who will be of service as an instructor for the enlisted men and improve the morale and discipline of the company. It should be an established policy to retain these officers at the school when the companies are replaced by others, unless the companies brought to the school have commanders equally as good or better.

If the school course is to be of any benefit to the enlisted men sent here for instruction, the permanency of these particular company commanders is of vital importance. Each company should also have attached to it an officer who could go with it from the school to the field if necessary, and who would know what instruction the company has had under the experienced officer, and be able to continue this course of instruction or improve upon it if his ability has been increased by his experience.

There has been a lack of instructors during the year, and there is now, thus requiring the director or superintendent to act as such to the detriment of the purely administrative work. At present there are but two instructors for the student officers, one of those being the superintendent.

A casual detachment for the handling of all casual enlisted men passing through Manila and arranging for the departure of all vagrants and indigents from the islands to the United States has been maintained under charge of the supply officer and a student officer.

MEDICAL ORGANIZATION.

A dispensary containing a small stock of medicine and the necessary cots is maintained at the school under charge of the superintendent, medical division. Only minor cases are treated therein, and it will be ample in its present condition for all purposes so long as the school is in Manila, conveniently located near the civil hospital.

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IMPROVEMENT OF BUILDINGS.

During the past year a gymnasium was arranged out of the old forage shed. Fireplaces and a cement floor were installed in the enlisted men's kitchen; a band room and a barrack room were constructed in one of the main buildings used as a stable. Minor repairs are being made to the offices, officers' quarters, and stables. No material addition has been made and none is recommended in consideration of the contemplated change to the site at Baguio.

RECOMMENDATIONS.

That an officer capable of performing the duties of adjutant and instructor of student officers be assigned to the school as soon as possible; that when the student company is discontinued at the end of August the officer now in command be assigned as instructor of student officers; that two additional officers, experienced, capable, tactful, in fact excellent company commanders, be placed in command of the two companies stationed here; that there be one other officer with each of these companies at all times in addition to the company commanders; that the companies be equipped with the modified Krag carbines, and that 80 additional modified Krag carbines be added to the permanent equipment of the school for the use of student officers and enlisted students. Whenever the companies are removed from the school the companies replacing them should be equipped with the new arms. Only men of intelligence and with some education should be sent to the school as enlisted students. With the addition of three officers to the personnel of the school, the superintendent can attend to general administration, and at the same time perform his duties as member of the officers' examining board.

Very respectfully,

CHARLES J. KINDLER,
Superintendent of School.

EXECUTIVE INSPECTOR, BUREAU OF CONSTABULARY,
Manila, P. I.

REPORT OF CHIEF SUPPLY OFFICER.

HEADQUARTERS PHILIPPINES CONSTABULARY,
OFFICE OF THE CHIEF SUPPLY OFFICER,
Manila, August 5, 1907.

SIR: I have the honor to submit the following report covering the operations of this office for the year ended June 30, 1907:

DUTIES.

This office is charged with the general supervision of the five divisions through which the bureau is fed, clothed, armed, equipped, quartered, and paid; with providing, through the medical division, for medical attendance, treatment, and supplies for its officers, enlisted men, and employees; with the preparation of the annual estimates for appropriation and the accounting for funds appropriated for the maintenance of the bureau, and with the drafting from time to time of orders and regulations intended to improve its fiscal organization and administration.

Three important changes, affecting the efficiency of the organization as a fighting machine, its accounting system, and its cost, have been made during the year:

1. The rearming of the enlisted personnel with the United States magazine carbines, and later equipping this arm with a bayonet.
2. The complete revising of the method of clothing the enlisted men; and
3. The sale of the Benguet stage line.

The first of these changes gives the organization a modern repeating weapon, light in weight, and the advantage of having a bayonet to withstand bolo rushes. This work is half done and funds are available to complete it.

Since the organization of the bureau the method of issuing and accounting for clothing has caused considerable dissatisfaction, due mainly to the fact that no authentic audit of these accounts could be made. For this and other obvious

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reasons it was considered advisable to change the clothing allowance, giving each man on his enlistment ₱42 credit, selling the clothing direct to him and making a settlement with him at the time of his first payment. With this ₱42 his company commander is charged with seeing that a proper outfit of clothing is purchased. Thereafter, and until his discharge, he is entitled to a quarterly allowance of ₱9, which is paid to him at the end of the quarter. Within this amount any uniform clothing desired may be bought by him, but clothing purchased in excess of the allowance is charged directly against his pay.

This system allows a clean-cut method of accounting, whereby no balance is due either the man or the government after each payment, and a thorough audit by the insular auditor, and encourages the man in the care and preservation of his clothing.

The third change, the sale of the Benguet stage line, has removed an incubus from the shoulders of the bureau. This stage line was originally installed to open communication with and encourage travel to Baguio. Although this bureau was charged with its maintenance and operation, and the expense connected with it was borne by our appropriation, other branches of the government derived quite as much benefit perhaps from its operation. The fare charged each passenger, ₱20, by no means paid for its maintenance, and for the last six months of its existence under the control of this bureau it was operated at a net loss of ₱16,330.20, not including wear and tear on rolling stock and equipment and deterioration of animals. The loss for the fiscal year 1906 was ₱34,718.40.

It was, then, with a feeling of relief that the operation of this stage line was in February last transferred to C. M. Jenkins. Mr. Jenkins bought of us 35 mules and what other transportation he needed to complete his equipment, for ₱12,000, and was granted a subsidy of ₱1,600 per month for eighteen months, or until such time as a shorter means of communication should be established.

FINANCIAL.

The appropriation for the fiscal year 1906 as provided in acts Nos. 1416 and 1478 aggregated ₱3,744,121.36; of this amount there remained on hand on June 30, 1906, ₱151,496.62; and undrawn in the treasury, ₱196,278.51, making a total of ₱347,775.13.

Against this amount, however, there were outstanding liabilities practically covering it. The entire appropriation for the bureau during the fiscal year 1907, as provided in acts Nos. 1527 and 1660, aggregated ₱3,151,800, of which there remained on hand June 30, 1907, ₱150,449.18; and undrawn in the treasury, ₱88,669.55, making a total of ₱239,118.73.

As at the end of the preceding year, the bureau had outstanding liabilities practically covering this surplus.

Following is a statement of the financial operations of the bureau for the year:

On hand June 30, 1906	₱151,496.62
Undrawn in the treasury June 30, 1906	196,278.51
Appropriated in acts Nos. 1527 and 1660	3,151,800.00
Total credits	3,499,575.13
Disbursed during the year (including outstanding obligations from last year)	3,251,436.40
Undrawn in treasury June 30, 1907	88,669.55
Losses from defalcations	9,020.00
On hand June 30, 1907	150,449.18
Total debits	3,499,575.13

Included in the amount shown as disbursed during the year are the following items, which do not properly belong to our currrent appropriation:

Construction permanent barracks and quarters	₱88,568.01
Pensions	1,420.20
Transportation of commissary stores	9,825.33
Total	99,813.54

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Deducting this amount from our total expenditures during the year and dividing the result so obtained by the average number of officers and enlisted men, 5,128, the per capita cost of the constabulary during the fiscal year was ₱614. This includes ₱347,775.15 of outstanding obligations carried over into and paid during the present year.

PAYMASTER'S DIVISION.

This division, under the supervision of Capt. A. H. Thomas until June, and then under Lieut. W. C. Kruegel, is charged with paying the salaries of all officers and clerks in the bureau and the wages of skilled and unskilled employees of the bureau in this city; with the payment for all supplies delivered under contract or purchased in open market; with the payment of all transportation bills to the various common carriers in the islands, and with suplying funds to the different district and provincial supply officers.

During the year, as shown by the detailed report of the acting paymaster herewith, a total of ₱1,300,211.02 was disbursed, and ₱1,738,291.17 was transferred to the different supply officers. This shows an increase in disbursements over last year of practically ₱90,000 and a decrease in transfers of ₱775,000. The system adopted at the close of the last fiscal year of paying all officers and clerks of the bureau on unsigned pay rolls by check, the numbers of which are inserted on the roll instead of the creditors' signatures, has been most satisfactory, lessening the amount of labor involved, and in general insuring the more prompt payment of all officers and employees regardless of where stationed. It has lessened the district supply officers' work to such an extent that they are frequently available as examiners and instructors for our new supply officers.

QUARTERMASTER'S DIVISION.

One of the most important duties of this office, affecting as it does the mobility of the organization, is the transportation of our personnel and supplies. The cost of this item of our appropriation is second only to the salaries and wages of the personnel. This branch of the work, together with receiving and caring for supplies, has been in charge of Capt. A. C. A. Bortels, whose detailed report is forwarded herewith. At the close of this year this officer, to enable him to take his accrued leave, was relieved from duty by Capt. Thomas Carl.

During the year it has been our endeavor to obtain as many of our supplies as possible from the insular purchasing agent. Three hundred and forty-four requisitions have been made on that officer, which have been generally filled with sufficient promptness to meet the needs of our service. Two contracts for supplies were let during the year—one for mineral oil, of which the bureau uses some 25,000 gallons per year, and the other for khaki cloth, used in making enlisted men's uniforms. In addition to supplies received upon requisition from the bureau of supply and purchases under contract, it has been found necessary, in order to meet emergency requirements, to make 269 open-market purchases. These, as a general rule, are supplies urgently needed at some remote station, where a requisition on the bureau of supply could not be filled in time to be shipped on a certain boat. The amounts involved in this class of purchases, however, are generally small. At times it has been found necessary to call upon the Quartermaster and Medical Departments of the United States Army to assist us in filling rush orders. These branches of the Federal Government have responded with uniform promptness and courtesy, and have been of material help in efficiently supplying the wants of the bureau.

The close of this fiscal year shows that we have reduced our stock in the quartermaster's division by ₱125,984.43. On June 30, 1907, there remained on hand property to the value of ₱258,767.85.

The subsidizing by the government of certain interisland vessels has contributed probably as much as any one thing to the general welfare of the bureau. Where formerly shipments were made at irregular and unknown intervals, we now have a definitely fixed communication with even our most remote, outlying stations. This has made the carrying of large stocks in the various provinces unnecessary. It has enabled the bureau in many cases to supply the provinces direct from Manila. On account of the superior facilities the quartermaster has for storing and caring for clothing and other supplies, this is a most economical measure wherever it can be carried out

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Under present agreement Bilibid Prison makes our uniforms at ₱0.85 per suit, this bureau furnishing the necessary khaki only. The uniforms are well made and no complaint has been submitted.

The hire of cutters and launches from the bureau of navigation is one of our largest items of expenditure. The smaller our force the greater, within a limit, the necessary expenditure for transportation. To cut down on water transportation in general means to cut down efficiency.

Land transportation in Manila, which during the fiscal year 1906 cost the bureau ₱14,100, was last year reduced to ₱7,188.

A saving of ₱23,356.67 was made on imported forage. This was made possible by the sale of 35 mules of the Benguet stage line and the general policy of using palay and grass wherever it could be obtained cheaply and without incurring the risk of surra and other diseases of the native stock of the islands.

An itemized statement of the operations of this division is shown in the quartermaster's report herewith.[a]

MEDICAL DIVISION.

This division was under the supervision of Capt. Thomas C. Walker until May 5, 1907, when he resigned on account of ill health. Captain Walker was relieved by Capt. Samuel C. Gurney. Medical attention is furnished all branches of the civil government when other medical officers are not available.

As will be seen by the reports of these two officers, ₱8,349.38 worth of supplies were purchased during the year, of which almost one-half remained on hand June 30.

The hospitals mentioned in our last report have been continued with two exceptions—Catbalogan, Samar, and Zamboanga—the former of which was given up last September on account of our not having a sufficient number of surgeons to supply the needs of the bureau at this and other points, and the latter in December, on account of the proximity to the military hospital at that point and the urgent need of the services of the surgeons elsewhere. During the month of May, with 7 companies of constabulary in the field, and the only point where medical attendance was available being some distance from the provincial capital, it was found necessary to reopen the hospital at Catbalogan, which at the close of the year was well equipped and doing excellent service.

This division at the close of the year had a personnel of 13 officers and 57 enlisted men. The number of enlisted men would not be sufficient to supply the wants of the service if it became necessary for all or many of our companies to take the field at the same time. There should be 1 trained "practicante" for each company, or a total of 100. This would increase the enlisted personnel by 43 men, but it is earnestly recommended.

During the year the general health of the entire bureau has been very good, as shown by the detailed reports of Doctors Gurney and Walker herewith. The medical division has efficiently carried out during the year the object for which it was organized.

ORDNANCE DIVISION.

This division at the beginning of the year was under the supervision of Capt. J. R. Schultz, but shortly thereafter was consolidated with the commissary division and placed under the supervision of Capt. Asa F. Fisk. The repairing and manufacturing plant was abolished and the work of repairing arms and equipment was turned over to the Manila ordnance depot of the United States Army. This branch of the Federal Government has promptly answered every call made upon it, and we acknowledge our indebtedness to Maj. Charles B. Wheeler, chief ordnance officer, Philippines Division, U. S. Army, for his efficient help during the year.

Authority has been granted to rearm our entire organization. Two thousand four hundred and twenty of the new United States magazine carbines, caliber .30, have been purchased, of which 1,615 have been remodeled to carry the bayonet. At the close of the year 2,120 of these new arms were in the hands of the various organizations, as shown by Captain Fisk's report. It is expected that before the end of the present calendar year the process of re-

[a] A number of the tables referred to have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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arming will have been completed and our organization armed with a modern repeating rifle. During the year 1,746 Springfield carbines, 58 Winchester shotguns, and 2,200 revolvers were cleaned, repaired, and reblued at the Manila ordnance depot, at an average cost of ₱1.60 per arm.

This division during the year manufactured articles of equipment, such as bridles, belts, etc., aggregating a value of ₱1,500.

COMMISSARY DIVISION.

This division early in the fiscal year was consolidated with the ordnance division and placed under the supervision of Capt. Asa F. Fisk, whose detailed report of its operations is submitted herewith. As will be seen by reference thereto, 14 commissaries have been completely closed out during the year, leaving only 10 still in existence. The stock on hand in the provinces at the beginning of the fiscal year has been reduced by ₱29,163.22, leaving on hand therein at the end of the year ₱16,154.50. Of the 10 remaining commissaries, those of Benguet, Antique, and Tayabas are practically now sold out, and following out the general policy of this office the remaining 7 will be closed out as rapidly as commercial enterprises can supply the necessary foodstuffs to government employees in remote stations. The actual loss by deterioration was ₱1,564.33. The entire loss, however, including ₱1,200 in a defaulting officer's accounts not secured from the bond company, was ₱8,136.60. This loss is due to the selling at reduced prices of the remnants of stock in the 14 branch stores closed out during the year. As the commissaries remaining in operation are in remote stations, where the cost of transportation represents a considerable item of the expense (transportation to Bayombong being 34.58 per cent of the entire cost of supplies), we shall continue to operate these remaining stores at a loss until all are closed out.

The consolidation of the duties of the commissary division and the ordnance division into one, in charge of Capt. Asa F. Fisk, has given one more much needed captain to the line, and has resulted in no decrease in the efficiency of the management of these two divisions.

SUPPLY OFFICES.

The remarks in the last annual report under the heading "Supply officers" still obtain. In the fiscal year ending June 30, 1906, it was found possible to reduce the number of supply officers from 52 to 35. The end of the fiscal year 1907 found us with 38 supply officers, this increase of 3 being due to the fact that some of our more experienced officers are on leave and it has been necessary to utilize inexperienced men and give them smaller responsibilities. The total cost of extra compensation to these officers, however, has not been increased during the year.

It is with regret that two cases of malfeasance in office were recorded during the year, both of which occurred with men long in the service and considered thoroughly trustworthy. Their prompt detection resulted in the imprisonment of one and the death by suicide of the other, proving that the inspecting branch of the service is not being neglected. It has been deemed advisable, however, to keep a thorough record of all examinations made by both district auditors and inspecting officers of this bureau, so that no officer's accounts will remain unexamined more than three months.

The present system of checking can hardly be improved upon. With accounts passing through this office and being inspected by officers thoroughly cognizant of the duties of a supply officer, with the cash and deposit verified at the end of each month by the senior inspector or some other reliable officer of the government, and with the quarterly examinations of the accounts by the district auditor no peculations or errors can go long undetected.

ROUTINE WORK.

That the passing of each supply officer's accounts through this office before going to the auditor, as noted in the last annual report, results in a more economical and efficient service, is indisputable. By this means the supply officer is promptly notified of any errors in his accounts, his district director notified of any purchases being made of supplies which can be obtained at less cost here; above all we get a prompt and correct abstract of every expenditure, an absolute essential in keeping a correct account of our assets and liabilities.

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GENERAL REMARKS.

There was actually appropriated for the bureau of constabulary for the fiscal year 1906 ₱3,744,121.36. Besides this the bureau of navigation gave us free transportation costing ₱150,000, so that in reality there was appropriated for the bureau of constabulary for the fiscal year 1906 ₱3,894,121.36. For the fiscal year 1907 there was appropriated ₱3,151,800. Out of this we have paid all of our obligations to the bureau of navigation, have in part rearmed the constabulary, and have on hand funds available to complete this rearmament. We also paid ₱79,000 for shoes that we expected at the time of the last annual appropriation to sell to the army, and had on hand at the end of the fiscal year funds sufficient to meet all outstanding obligations.

This reduction of ₱742,321.36 from the expenditures for the previous year was obtained by reducing the stock of clothing and other supplies on hand in our store rooms in this city, by a slight reduction in the enlisted strength, and above all by the careful pruning of the small expenditures in all of our 200 or more stations. These economies, while seemingly small in each case, were large in the aggregate.

Our total refunds for services and supplies to the insular treasury for the fiscal year 1907 amounted to ₱85,947.96.

The system of bookkeeping introduced by Capt. A. J. Robertson, assistant chief supply officer, graphically disclosed the rise and fall of expenses under the 79 subheads he maintained, enabled us at once to check any apparent extravagance, and by instituting a series of comparisons in relative expenses apparently imbued all officers with a purpose to help us to make good our promises to the Commission at the time of the passage of the last appropriation act that there should be no deficiency bill presented on the part of the bureau of constabulary for the fiscal year 1907. The Commission has since gracefully recognized Captain Robertson's efficiency by giving him the rank of major.

That the bureau has been promptly and well supplied so far as its means would allow is due to the efficient organization of the different divisions and to the earnest cooperation of their chiefs.

Respectfully submitted.

MARK L. HERSEY,
Chief Supply Officer.

The EXECUTIVE INSPECTOR, BUREAU OF CONSTABULARY,
Manila, P. I.

BUREAU OF CONSTABULARY, OFFICE OF THE PAYMASTER,
Manila, P. I., July 29, 1907.

SIR: I have the honor to submit herewith my report for the fiscal year ended June 30, 1907.

DUTIES.

This office, under direction of the chief supply officer, is charged with obtaining from the insular treasurer, upon requisition, as needed, moneys appropriated for the bureau of constabulary; with the transferring, in cash or by deposit in the insular treasury, of funds necessary for disbursement by the various supply officers; with the paying of all officers and civil-service clerks in the constabulary; of all per diem and reimbursement vouchers of the first district, and of all other obligations incurred for supplies furnished and services rendered the bureau; and with the accounting to the insular auditor, in accordance with law, for all funds handled by this office.

In June Paymaster A. H. Thomas was granted leave of absence to visit the United States. In order that he might have proper time for the settlement of his accounts before leaving, the undersigned was appointed acting paymaster on May 17, 1907. The present report is therefore practically only a review of the work of my predecessor, on whom too much praise can not be bestowed for his painstaking care in the gathering and preservation of the records of this office.

TRANSFERS.

During the fiscal year 378 transfers were made to supply officers, of which ₱1,191,495.65 was by deposit and ₱546,795.52 by cash, making a grand total of ₱1,738,291.17. Transfers by cash are usually made by boxing the money

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securely and then turning it over to the quartermaster for shipment, but at times it has been found more convenient to remit by registered mail to a few supply officers who are stationed in ports which are at periods during the typhoon season storm bound. Packages sent by registered mail are always insured as a guaranty against perils of the seas, risks of fire, robbery, etc. In a few instances checks have been sent direct to the supply officers for the amounts of transfer, but this course has only been followed in cases where the supply officers were not in possession of check books. This, however, has happened very rarely and only in the early part of the year when the provincial treasurers were plentifully supplied with cash, owing to income from cedula taxes, etc.

Transfers to supply officers are, as a rule, completed by the 25th of the month preceding that for which the funds are needed. It is the policy of this office to have the funds in the hands of supply officers before the 1st of the month for which payment for subsistence is to be made, the adoption of which course also allowing prompt payment of pay due for previous month, but some supply officers are prone to defeat their ends by delaying to mail their requisitions until the last moment, causing not only great inconvenience to themselves, but also to this office.

One point in the matter of transfers well worthy of note is that, whereas in the fiscal year ended June 30, 1906, the total of transfers amounted to ₱2,515,561.83, of which ₱1,981,679.63—a little more than 78 per cent of the total—was by deposit during the present year, of ₱1,738,291.17 transferred, only ₱1,191,495.65—but 67 per cent of the whole amount—was by deposit, a decrease of 11 per cent in deposits in relation to total amount of transfers for fiscal year 1907, as compared with the previous fiscal year. This in spite of the fact that the supply of ready money in the provinces has been and is increasing steadily. The change from a heavier to a lighter weight coinage, making it compulsory for provincial treasurers to remit the old coins to the insular treasury, may account for a part of this decrease in deposits as compared with the total amount of transfers, but not for the whole, especially as the change of coinage referred to only became effective during the latter part of the present year.

PAY ROLLS.

On July 1, 1906, the payment of all officers and civil-service clerks of the constabulary was turned over to this office, initiating a system not only more beneficial to the officials themselves, but of inestimable value to this bureau in the completion of its records. Under the system previously in vogue, that of payment by district supply officers, records were too scattered, and if headquarters desired information regarding payment made to a man after a lapse of some time it was found necessary in many cases to obtain the desired data from the auditor's office.

For convenience in checking and recording, the following 14 separate pay rolls are made out by this office:

1. United States army officers.
2. Assistant directors and majors and senior inspectors.
3. Staff.
4. Inspectors and captains.
5. Inspectors and first lieutenants.
6. Inspectors and second lieutenants.
7. Inspectors and third lieutenants.
8. Subinspectors.
9. Medical division.
10. Extra compensation to supply officers.
11. Civil-service clerks.
12. Permanent agents.
13. Supply officers' clerks.
14. Messengers.

In the preparation of these rolls, averaging a total of ₱68,000 monthly, the utmost care is taken, the data which has been systematically recorded as received being checked with an independent list of changes furnished this office by the executive inspector toward the end of each month.

Work on the rolls is commenced soon after the 20th of each month, and from this date to the end of the month nearly the whole time of the office is given

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to their preparation and other work pertaining thereto. Checks are mailed promptly on the last day of each month and are in the hands of those concerned shortly thereafter.

An address book is kept carefully and strictly up to date and, considering the poor mail service in many parts of the provinces, the little delay in the transmission of checks is a matter of growing satisfaction. This office considers the keeping of these addresses accurately and to date as an absolute essential to the success of this system of payment, and from the beginning of the financial year no blame has been attached to this office for the loss or delay of a pay check.

The expenditure on the 14 pay rolls above cited has amounted during the fiscal year to the sum of ₱833,102.58.

PAYMENTS.

In addition to the usual transfers of funds and payments involved in the pay rolls, there falls on this office the payment of vouchers for supplies furnished and services rendered. It has been the object of the undersigned during his short term of duty in the position of acting paymaster to profit by the example of his predecessor in the careful and prompt payment of commercial and other obligations upon the rendition of properly approved vouchers.

During the last fiscal year 314 per diem and reimbursement vouchers, aggregating a total of ₱7,642.67, were paid by this office as received from the different officers of the first district. While the total of this expenditure is comparatively insignificant, it is necessary to take into account the fact that it represents payments from January 1, 1907, only, and a better idea of the volume of work involved may be gained by stating that the expenditure named covers considerably more than one-sixth of all vouchers paid during the same period of the year.

Three thousand three hundred and six vouchers, aggregating ₱1,300,211.02, were paid during the fiscal year. While this is not as many as were paid during the previous year, there is a total increase of ₱90,000 actually expended on vouchers. It should be mentioned in this connection that, although the pay rolls are only represented by 14 vouchers monthly, they pertain to the payment of about 400 salaries, to which individual attention has to be given in respect of deductions under various heads, and which often necessitate explanatory correspondence.

CORRESPONDENCE.

The communications both sent and received by this office have materially increased during the year as a natural result of the growing business passing through its hands.

The pay rolls, involving promotions, deductions, refunds, etc., have greatly swelled the number of letters sent. It is only reasonable that each one should wish to be notified of any deduction from pay and the cause thereof, and it has therefore, been the practice of this office to transmit invariably to the person concerned the necessary explanation with his pay check.

CHANGES.

By far the most important change that has taken effect during the present fiscal year is the one made in act No. 1478, Philippine Commission, permitting the continuance of an appropriation under various subheads from any one fiscal year into the following, not as a supplemental account for that year, but simply as an increase for that year's appropriation. This has revolutionized the system of accounting, being far more convenient through its pliability, not only in regard to bookkeeping, but in so far that it allows considerable latitude in transferring a balance from one subhead to another.

Act No. 1527, Philippine Commission, dated August 18, 1906, authorizes only the following subheads:

Administrative expenses, bureau of constabulary; services and supplies, bureau of constabulary; commissary stores, bureau of constabulary; constabulary relief fund, section 11, act No. 619; constabulary relief fund, section 14, act No. 619.

This consolidated all the subheads—"pay," "clothing, camp, and garrison equipage," "barracks and quarters," "transportation," "secret service," "sub-

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sistence," and "contingent expenses" under the one subhead "administrative expenses." This office has, however, for the sake of convenience carried two main subheads, "salaries and wages" and "contingent expenses."

Attention is invited to the tabulated statements hereto appended[a] in which the office work in detail is more fully shown.

Respectfully submitted.

W. C. KRUEGEL,
Acting Paymaster, Philippines Constabulary.

The CHIEF SUPPLY OFFICER, BUREAU OF CONSTABULARY,
Manila, P. I.

BUREAU OF CONSTABULARY,
OFFICE OF THE QUARTERMASTER,
Manila, July 29, 1907.

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1907:

DUTIES.

The quartermaster division which is conducted under the general direction and supervision of the chief supply officer, bureau of constabulary, was charged with various duties, the principal of which are:

1. The receiving, inspecting, accounting for, and preserving of all quartermaster's supplies purchased by the chief supply officer upon estimates submitted by the quartermaster.
2. The proper distribution of such supplies to the various district and provincial supply officers and the medical officers stationed throughout the islands.
3. The providing of transportation for officers, enlisted men, and employees, and the shipping and providing of transportation for not alone quartermaster's supplies but also all supplies of the commissary division, the ordnance division, the paymaster division, and the medical division.
4. The providing of transportation for passengers and freight of all bureaus and officers of the government of the Philippine Islands over the Benguet road.
5. The settlement and preparation of vouchers for all bills covering persons transported on "transportation requests," of freight carried on "bills of lading," including not alone such "requests or bills of lading" issued by the quartermaster but also those issued by the various supply officers in the provinces.

CITY TRANSPORTATION.

During the fiscal year all land transportation needed by the constabulary was hired from the city of Manila, as may be seen from the following table:[b]

This transportation was used in hauling supplies to and from railway depot, to and from vessels in the Pasig River, and to and from our lighter. The carromatas were used for necessary transportation of officers and employees. In the last annual report the hope was expressed to hold the cost of city land transportation for the fiscal year ended June 30, 1907, within ₱10,000. From above table it will be seen that even better results were obtained, the cost having been but ₱7,188.34 for the year.

The service rendered by the city was quite satisfactory.[c]

In the above table is not included the forage shipped by the bureau of supply, the amount and cost of which, including transportation from Manila to the nearest port or railway station, was ₱71,495.13.

Last year the total cost was ₱94,852. Therefore it will be seen that this year we spent ₱23,356.67 less for imported forage than we did last year. However, it must be borne in mind that in February, 1907, we sold to Mr. C. M. Jenkins 35 mules, thus reducing the demand for imported forage to that extent.

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[a] These statements have been omitted and filed in the Bureau of Insular Affairs, War Department.

[b] This table has been omitted and filed in the Bureau of Insular Affairs, War Department.

[c] A table showing shipments made during the fiscal year has been omitted and filed in the Bureau of Insular Affairs, War Department.

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In the above figures is not included the grass, palay, etc., purchased by supply officers in the provinces, nor the cost of transporting forage from ports to inland stations.

MEANS OF LAND TRANSPORTATION.

The following table, compiled from the latest property returns, shows the means of transportation owned by the bureau of constabulary:[a]

WATER TRANSPORTATION.

From the following table it will be seen that the cost of hiring cutters and launches from the bureau of navigation during the year amounted to ₱96,289.85, as against ₱112,460 during the preceding year, a decrease of ₱16,170.15.[b]

PASSENGERS.

The following table shows the number of transportation requests issued during the year by the quartermaster and supply officers in the provinces, together with the number of first, second, and third class fares, and total cost:

By—	Fares.			Number transportation requests issued.	Amount paid.
	First.	Second.	Third.		
Interisland boats	450	14	2,892	1,262	₱30,836.46
Railway	1,036	110	2,694	1,316	3,971.00
Total	1,486	124	5,586	2,578	34,807.46

All bills for the transportation outlined in the above table have been settled by this division.

BENGUET STAGE LINE AND FREIGHT SERVICE.

The following tariff of charges, etc., for the transportation of passengers on the stage line between Dagupan and Baguio, and for the transportation of government supplies over the same route was in force during the fiscal year ended June 30, 1907:[c]

EXTRACT FROM CIRCULAR 33, JUNE 30, 1906.

* * * * * * *

FARES.

[Direct.]

Up.		Down.	
Dagupan to Twin Peaks	₱10.00	Baguio to Twin Peaks	₱10.00
Twin Peaks to Baguio	10.00	Twin Peaks to Dagupan	10.00

INTERMEDIATE POINTS IN EITHER DIRECTION.

A.

Between Dagupan and Mangaldan	₱1.60
Mangaldan and San Jacinto	.60
San Jacinto and Manoag	1.20
Manoag and Pozorubio	2.20
Pozorubio and Twin Peaks	4.40
Total Dagupan to Twin Peaks or return	10.00

[a] This table has been omitted and filed in the Bureau of Insular Affairs, War Department.

[b] A table showing this in detail has been omitted and filed in the Bureau of Insular Affairs, War Department.

[c] A table showing freight charges and data containing regulations covering free transportation and passengers' baggage has been omitted and filed in the Bureau of Insular Affairs, War Department.

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B.

Between Twin Peaks and Camp Four	₱3.70
Camp Four and Baguio	6.30
Total Twin Peaks to Baguio or return	10.00

* * * * * * *

The following financial statement shows that during the six months ended December 31, 1906, the stage line was operated at a loss to this bureau of ₱16,330.20.

COST OF OPERATIONS JULY 1, 1906, TO DECEMBER 31, 1906, INCLUSIVE.

Salaries and wages, and incidental expenses	₱11,145.67
Forage and incidental supplies	10,457.39
	21,603.06

RECEIPTS.

Miscellaneous collections by quartermaster, Philippine constabulary	₱30.00
Collections as per July report of Lieutenant Ashe	615.00
Collections as per August report of Lieutenant Ashe	702.35
Collections as per September report of Lieutenant Treadaway	767.83
Collections as per October report of Lieutenant Treadaway	677.79
Collections as per November account of Lieutenant Treadaway	1,111.37
Collections as per December account of Lieutenant Treadaway	1,368.52
	5,272.86
Loss during the six months of operation	16,330.20

It was not believed fair that the constabulary should be charged with this business and continue to lose large sums out of its otherwise small enough appropriation. Upon the urgent recommendations of the chief supply officer, concurred in by the director of constabulary and the honorable the secretary of commerce and police, the Commission, after advertising for bids, authorized the sale of the stage-line business, including most of the property, to Mr. C. M. Jenkins, of Dagupan and Baguio. After a contract between the government and Mr. C. M. Jenkins had been properly executed, the stage line was finally turned over to the latter on February 22, 1907. By selling the stage line we also gained the release of about ₱14,000 worth of property, consisting mostly of live stock, vehicles, harness, etc., that were badly needed in other parts of the islands.

QUARTERMASTER SUPPLIES.

For the sake of convenience property is grouped into ten classes, as follows: Class No. 1, fuel; class No. 2, forage; class No. 3, stationery; class No. 4, office and barrack furniture and fixtures; class No. 5, means of transportation; class No. 6, tools; class No. 7, horse medicines, etc.; class No. 8, miscellaneous expenditures; class No. 9, clothing and materials; class No. 10, equipage.

Attention is invited to the following table, which gives a fair idea of business done and extent of accountability.

Value of all property on hand on July 1, 1906	₱384,752.82
Value of property received from all sources during the fiscal year ended June 30, 1907	175,143.79
Total value	559,896.61
Value of all property transferred to provinces, sold, expended, or destroyed during the fiscal year ended June 30, 1907	301,128.76
Value of property on hand June 30, 1907	258,767.85

In the value of property on hand July 1, 1906, and June 30, 1907, are included all articles in use in the offices of the director, chief supply officer, inspecting officers, board room, executive division, paymaster, quartermaster, and in the several storerooms.

The records show that 736 requisitions were received and acted upon during the fiscal year; that 269 open-market purchase vouchers have been accomplished; that 120 purchase vouchers from the bureau of supply and other bureaus have been settled; that 107 transfers have been made by officers in the provinces to the quartermaster; and that the quartermaster has made 998 transfers to supply officers or other accountable officers in the provinces or Manila.

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Class 9, clothing and materials, is the most important part of all property, as upon it depends, in a large measure, the discipline and welfare of the enlisted men.[a]

REMARKS AND RECOMMENDATIONS.

It having been definitely decided that as soon as the present supply of leggings is exhausted the puttee is to be adopted, and it is respectfully submitted that no more puttees be ordered up from Zamboanga. During the past year 601 pairs of puttees were received by this division from Zamboanga, of which 513 pairs were reshipped to various companies. On June 30 we had 11,917 pairs of leggings on hand, which, judging from past consumption, are sufficient to supply the constabulary for another year and a half. The more puttees we furnish now the longer it will take to use up the supply of leggings on hand.

It may be well to encourage the sale of our leggings to municipal police. Senior inspectors and company commanders probably can do much to help this matter along.

During the year the quartermaster purchased for various companies from "mess savings" quite a number of gold-medal cots. It is respectfully recommended that iron beds with bejuco bottoms, of the kind that 500 have been advertised for, be furnished all companies as soon as our appropriation will stand it. It is believed the government should furnish the enlisted men with some kind of a bed, and that "mess savings," if any, should be used otherwise. As it stands now, if some companies should be situated so unfortunately as to be unable to accumulate sufficient "mess savings" in order to purchase or maintain cots, they will have to do without them.

It is further recommended that if sufficient funds can be made available all companies be supplied with uniform lockers of a pattern similar to a couple that have been on hand in this division for some time.

Very respectfully,

AUGUST C. R. BORTELS,
Quartermaster, Constabulary.

The CHIEF SUPPLY OFFICER, BUREAU OF CONSTABULARY,
Manila, P. I.

BUREAU OF CONSTABULARY,
OFFICE OF THE ORDNANCE OFFICER,
Manila, July 29, 1907.

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1907:

The principal feature of the past year's work has been the rearming of the troops with the United States magazine carbine, caliber .30, and the conversion of the carbine into a short rifle. The cost of this conversion has so far averaged ₱3.17 per arm, making the cost of the new arm, remodeled, ₱11.17 and of the cleaned and repaired arm ₱9.17.

The cost of a complete equipment for a soldier is ₱24.08, or ₱22.08. Owing to the scarcity of the new, we will have to purchase 1,770 cleaned and repaired carbines to completely rearm our troops. This will make the total cost of rearming and full equipment ₱137,406.

We have so far paid on this account ₱22,000, which leaves a balance of ₱32,406 to be paid out of the 1908 appropriation, if the total ₱83,000 available by act No. 1660 is applied on this account.

We had on hand June 30, 1906, 300 magazine carbines, and during the year purchased 2,120, making a total of 2,420. Of this number 1,615 have been remodeled during the past six months.[b]

Twenty-one field safes received from the provinces, totally unfit for service, have been repaired, repainted, and reshipped, 19 others have been repainted and combinations changed.

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[a] A table showing clothing handled during the year has been omitted and is on file in the Bureau of Insular Affairs, War Department.

[b] A table showing rifles repaired, condemned, and purchased, together with cost of same, has been omitted, and is on file in the Bureau of Insular Affairs, War Department.

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The average cost of the repair work by the Manila ordnance depot, per arm, was ₱1.60 for the year.

Captain Schultz estimated (fiscal year 1906) the cost of doing the work ourselves was ₱1.97 per arm, and so there was a saving of ₱0.37 or ₱1,276 on the 3,450 arms repaired. In view of the fact that Captain Schultz figured the total cost of our shops to get the average and that it costs practically ₱4,000 per annum to maintain the small force we employ to care for arms and equipment, handle the shipping, etc., the actual loss has been ₱2,724, which does not include transportation to and from the ordnance depot.

Over and above the repair of arms and equipment of a minor nature, property valued at ₱1,500 has been manufactured by the division.

Since July 1, 50 remodeled carbines have been furnished the first district, 100 sent (Samar) second district for exchange, and 100 to the third district for exchange.

Respectfully submitted.

ASA F. FISK,
Ordnance Officer, P. C.

The CHIEF SUPPLY OFFICER, PHILIPPINES CONSTABULARY,
Manila, P. I.

BUREAU OF CONSTABULARY,
OFFICE OF THE COMMISSARY OFFICER,
Manila, August 3, 1907.

SIR: I have the honor to submit the following report covering the operations of the commissary division during the fiscal year ended June 30, 1907:

Table A shows the purchases, transfers, and sales.[a]

STOCK.

In provinces, June 30, 1906	₱43,835.43
In transit	1,482.29
	45,317.72
In provinces, June 30, 1907	12,537.99
In transit	3,616.51
	16,154.50
Reduction in stock	29,163.22

Fourteen commissaries have been completely closed out during the fiscal year, leaving only 10 still in existence. Of this number Benguet, Antique, and Tayabas are practically sold out. This leaves Cagayan, Ilocos Norte, Isabela, Lepanto-Bontoc, Nueva Vizcaya, Samar, and Palawan still on the active list, though the latter acts only as a distributer with no losses or deterioration.

SALES.

The sales for the year, ₱88,251.67, cover all special and closing-out sales, so that the actual surcharge of 10 per cent is only available on about ₱60,000, netting ₱6,000 for running expenses.

ASSETS AND LIABILITIES.

Table B shows the assets and liabilities on June 30, 1907.[a]

LOSSES.

As will be noted, the loss for the quarter exceeded the surcharge of 10 per cent by ₱8,136.60. This loss, however, includes ₱1,200 in the Walsh defaulting account not secured from the bond companies.

The loss by deterioration was ₱1,564.33, or 2.6 per cent.

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[a] Omitted, and filed in the Bureau of Insular Affairs, War Department.

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TRANSPORTATION.

The cost of transportation was ₱6,165.32, or 10¼ per cent on regular sales. The cost of transportation to Bayombong was the highest, it costing 34.58 per cent on stores shipped.

The total losses then were as follows:

Dr.

10 per cent on ₱60,000 sales	₱6,000.00
Loss on previous net earnings	8,136.60
Total	14,136.60

Cr.

Transportation	6,165.32
Loss by deterioration	1,564.33
Loss through defaulting account	1,200.00
Loss through auction sales, etc	5,206.95
	14,136.60

In closing out the stock of the 14 commissaries, valued at ₱29,163.22, the loss has been only ₱5,206.95, or 17.8 per cent.

As will be noted by a glance at Table B, the net surplus or profits on June 30, 1907, amounted to ₱29,435.35.

The total loss of the bureau of supply on our old depot stock since taking over was ₱26,792.42. This included all losses by reduction in prices, auction sales and condemnation.

Even covering these losses, the government had a net profit on the six years business of ₱2,642.93. This on a grocery business run on a 10 per cent margin.

The cost of operation of the few remaining commissaries will be at a loss of probably 15 to 20 per cent during the next year, owing to the heavy cost of transportation, and having no commissaries left where a small profit can be made to offset this high cost to any extent.

Respectfully submitted.

ASA F. FISK,
Commissary Officer, P. C.

The CHIEF SUPPLY OFFICER BUREAU OF CONSTABULARY,
Manila, P. I.

OFFICE OF THE SUPERINTENDENT, MEDICAL DIVISION,
Manila, April 26, 1907.

SIR: Preparatory to availing myself of accrued leave of absence, I have the honor to submit a report of the medical division for the period from July 1, 1906, to April 30, 1907.

The following exhibit shows in detail, exclusive of salaries, the cost of maintenance of the division:

Supplies on hand, July 1, 1906	₱3,380.45
Supplies received	4,934.52
Total	8,314.97
Supplies transferred	6,202.47
Total remaining on hand	2,112.50
Rents and contingent expenses	2,438.00

As the necessary data will not be available until sometime after the close of the fiscal year, the above tabulation does not include accounts for medicines or medical attention paid by district and provincial supply officers; but there are ample assurances that this will prove even less than last year. It is doubtful whether ever before in the history of an organization of equal size the total

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cost of the maintenance of the sick, considering the character of the service rendered, was so exceedingly small. This detail would be further elucidated here, but it now seems sufficiently well established by abundant facts, figures, and experience that the bureau can provide for its sick much more satisfactorily and at considerably less expense to the government than would be possible if this division were administered by an independent bureau or by the military.

However economically it may be found imperative to maintain the division, it is sincerely hoped that during the approaching fiscal year funds will be forthcoming for the purchase of certain essential details of hospital equipment which we do not possess, and which are requisite if thorough, up-to-date work is to be expected of our medical officers. Among the items lacking and most indispensable are microscopes—there are but three in our service—glass operating tables, and modern instruments for capital operations. Our surgeons are well qualified to do advanced professional work, and every encouragement to this end should be extended in so equipping them that they would not be hampered or handicapped should serious operations be required (as is often the case) or epidemics of communicable disease render bacteriological examinations necessary. "Gold Medal" cots, for reasons of economy alone, if for no other, should be replaced by iron spring beds. Experience proves this cot—or any other for hospital purposes—to be expensive at any cost, and it is earnestly recommended that their use in this capacity be discontinued.

SUPPLIES.

Supplies purchased during the period covered by this report, while sometimes limited in quantity, have been of most excellent quality. Few open-market purchases have been made, the bulk of stock being imported from the United States and furnished by the Bureau of Supply. This method has proved advantageous in that drugs and the like are superior manufacture and are furnished at wholesale prices, plus the usual 10 per cent surcharge. On account of this arrangement, however, considerable dissatisfaction on the part of certain local druggists has been often expressed, as to them it seems unjust, heavily taxed as they are, to be compelled to compete with the government, whose imports are largely nondutiable and can accordingly be sold to the bureau at comparatively low figures. However this may be, as a matter of course it has been incumbent upon this office to buy whenever and wherever it could do so to most advantage.

Constabulary in those provinces where no medical officer is stationed are now furnished only a limited number of such simple medicinal preparations and other remedial agents as the average layman should be able to identify and use intelligently; and this plan has proved economical and efficient as well as quite satisfactory to all concerned. Complaints as to the scarcity of supplies, in so far as this office is aware, are now seldom, if ever, heard.

The new field chest, equipped with such drugs, dressings, instruments, etc., most likely to be required, and constructed as to prove easily transportable, recently introduced, has already demonstrated its indispensability and proved a substantial factor in the promotion of the efficiency of this division. The equipment of a company, if it does not include one, should be regarded as incomplete.

It is recommended—or at least suggested—that these chests, following the rule observed by the army, be used only in the event of field operations or in emergency. For routine garrison use the necessary supplies, as usual, can be furnished direct from these headquarters.

COMMISSIONED PERSONNEL.

At this writing there are in the service 5 surgeons with rank of captain, 1 of whom is superintendent of the division; 5 medical inspectors with rank of first lieutenant; and 3 medical inspectors with rank of second lieutenant. Since last report 1 captain and 3 first lieutenants have resigned and 1 second lieutenant has been dismissed.

Of the 4 vacancies thus created, only 2 have so far been supplied. Two active young physicians, of approved qualifications, character, and habits are needed to fill the remaining vacancies, and these, it is thought, could readily be obtained if proper request were made to the Bureau of Insular Affairs at Washington. And this is recommended.

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The value of these officers, not only to the constabulary, but to the various communities where serving as well, has during the past year, been so thoroughly confirmed that extended comment would appear superfluous. Parenthetically it should be stated at this juncture no little of the credit claimed by the bureau of health for apparently ridding the islands of certain forms of epidemic disease—notably smallpox—which the public press has often so loudly praised, might properly be placed where it belongs—with the medical officers of this bureau. From this no inference should be drawn that our doctors claim to have done more than was their manifest duty; they simply contend, and justly so it is thought, that apart from their legitimate duties as officers, they, and men under them, have faithfully cooperated with the insular health authorities in vaccinating thousands upon thousands of the native population, and have rendered immeasurable assistance in the inauguration and successful prosecution of a crusade against preventable diseases, which is responsible for the vastly improved conditions of health and sanitation prevalent in this archipelago to-day.

As proof of service rendered, where the bureau of health has done and continues to do absolutely nothing, witness the following from the last annual report of Governor Knight (Nueva Vizcaya) to the honorable Governor-General:

"The Philippines constabulary maintain a hospital in Bayombong, of which Dr. W. A. Robison, first lieutenant and medical inspector, has charge. As the constabulary force has been cut from 196 to 92 men in the last two years, and the constabulary posts are so distant from the headquarters at Bayombong, the hospital reports do not show many patients. This fact led the constabulary authorities some months since to consider discontinuing the hospital and withdrawing the medical officer. It was, however, brought to their attention that Doctor Robison, as acting president of the board of health without compensation, has done a large amount of provincial work and is the only medical man within four days' journey of Bayombong.

"There is not only not a doctor but not even a druggist or practicante, American or native, in the province, and if a physician were not stationed here the employees of the government would be entirely without medical attendance in cases of emergency.

"As an example of this necessity for a doctor in the province, I will cite the occurrence of an outbreak of smallpox which occurred in June among a company of immigrants from Ilocos Sur. Just after their arrival in Bayombong Doctor Robison was called to see a sick child, whom he found suffering from smallpox. He at once removed the entire company of immigrants to a quarantine camp in a sufficiently remote place and the outbreak was confined to 6 cases and 1 death, all among the immigrants, who were all kept in quarantine until all danger of further spread of the disease was past.

"This is the only outbreak of smallpox in the last two years, due to the good work of our present and former health officer.

"Owing to the remote situation of the province it will be necessary to keep a medical officer stationed here."

During his term of office the undersigned has visited with one exception all the hospitals maintained by the bureau; and in each province most commendatory expressions were heard from leading officials and others as to the great value of these institutions to the community at large and especially to the poor. It is said that the governor of Samar remarked that he regarded the temporary closing of the hospital at Catbalogan as little short of a public calamity.

Further space will not be consumed in the discussion of this particular subject, but the honorable Commission might well be brought to a proper conception of the facts, with a view to securing, if possible, increased pay for our junior medical officers. That the intrinsic value to the commonwealth of the competent physician should be reckoned as at least equal to, if not somewhat above, that of clerks, veterinarians, and inoculators of cattle is self-evident; and it therefore is earnestly and urgently recommended that the annual salary of second lieutenants of this division be increased from $1,400 to $1,600, and that of first lieutenants from $1,600 to $1,800. This the future will prove of undoubted necessity if an acceptable order of talent is had and retained permanently in service.

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ENLISTED PERSONNEL.

At the close of the last fiscal year the enlisted personnel numbered 57, and at the date of this report 56.

The maximum strength of the corps is 57, which is manifestly inadequate. To properly administer our hospitals and meet the requirements of outlying companies and detachments, a corps of no less than 100 is essential.

Medical officers, in enlisting the present force, have striven to secure the best material available, and only such as show a special aptitude for this important branch of the service and give promise after a thorough course of instruction are now accepted.

Many of our "practicantes" largely take the place of medical officers at a number of stations, with results that have been most gratifying and far beyond what was originally believed possible. Their services in the field have been especially meritorious and highly commended by officers and others; and it is a matter of record that through their familiarity with an intelligent application of the principles of first aid to the wounded, human life has been repeatedly saved.

The director of the bureau in his last annual report refers to the special utility of discharged native soldiers, constabulary, and scouts as officers in the municipal police, and states that many are now serving in such capacity, much to the betterment of that organization. As additional proof that the constabulary, in a sense, is an educational force in the islands, it might have been added that a number of our dicharged "practicantes" are rendering important service as local health officials.

In order that the service may prove attractive to the more desirable class of men, it is requisite that the pay be somewhat increased. Recently a registered practicante, of several years hospital training and valuable experience, expressed his willingness to enlist if assured of promotion to the grade of corporal within three months, if found available. (It is probably diverting, but he was accepted upon these terms). He remarked—and it is said to be a fact—that the pay and allowances of a private did not equal in amount the salaries offered by the various public hospitals in Manila, and that for qualified men there was at all times an active demand.

The fact should not be ignored that our medical staff is small, not nearly enough doctors to go around, hence the obvious importance of permanently maintaining at remote stations, where they must act, not under the supervision of a medical officer, but upon their own initiative, well trained, well qualified corps men.

By paying a trifle more, say 15 or 20 per cent more than at present, we could soon assemble a corps safely to be relied upon in any emergency likely to arise. It is especially recommended that the pay of sergeants of this division be increased to at least that of supply sergeants.

HOSPITALS.

Because of vacancies in the commissioned personnel, it was found necessary last September to close the hospital at Catbalogan, Samar; and on account of proximity to the military, and the urgent need elsewhere of the surgeon in charge, that at Zamboanga was also discontinued (December 31, 1906). There have been since last report no changes affecting other hospitals and wards, hence it would be repeating to note here the location of each.

It is regrettable that for reasons attributable to lack of appropriation for the purpose all provinces occupied by the bureau can not at this time be afforded home hospital facilities; but where this is true a room for the sick under the care of a trained enlisted man, is usually set apart by the senior officer, and this it has been found proves a fairly satisfactory substitute. Certainly it is an improvement over no provision at all.

District and other surgeons visit these provinces as often as practicable, and such of the sick as can not be properly provided for at their respective stations are transferred, on their recommendation, to the nearest hospital, constabulary, or military.

A number of our hospitals, notably that at Iloilo, being under the necessity of receiving the sick of adjacent provinces, are not infrequently taxed to their capacity, but actual overcrowding has not yet been the rule.

As hospitals, a majority of buildings in use are inadequate and not in that state of repair or originally so constructed as to prove desirable. Where this

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is true, in order that the sick may be made as comfortable as possible, it is recommended, even if it should involve a slight increase over what is now paid out in rents, that more appropriate structures be employed. In this connection it is recommended that the plans for the new quarters which, it is understood, are to be erected at various points in the future, be made to include a compartment for the exclusive use of the sick.

An entirely new structure, preferably of reenforced concrete, to be the property of the bureau, is demanded at Iloilo. This, at first glance, may appear extravagant, but the suggestion is not made unadvisedly. And this is obvious when it is considered that notwithstanding an enormous and other heavy incidental expense we are caring for the sick of this and other bureaus in that section (including two or three important islands) at an aggregate cost to the government of several thousand pesos less per annum than would obtain if the same service were rendered by the military or by others. In confirmation of this and for your consideration note the following from Doctor Gurney:

"On inquiring at the Presbyterian Hospital I find that they charge ₱2 a day for ward patients. The officials, however, would not entertain for one moment the idea of taking in our sick and wounded, stating it is not the policy of the hospital to fill their wards with paid patients, as it is primarily a charity organization, and this would defeat the object for which the hospital was built.

"On looking up the number of patients in the constabulary hospital during the last quarter I find the following:

	Patients.	Number of days.
July	20	365
August	25	485
September	25	414
Total	70	1,264

"This total number of days should be multiplied by 19 centavos, making the amount paid for patients while in the hospital for the last quarter	₱240.16
Rent of hospital	300.00
Electric light, average	60.00
Total	600.16

"Taking the average total days, 1,264, and multiplying by ₱2, which would be the cost of maintenance of our patients in the Presbyterian Hospital, it comes to the sum of ₱2,528, it being ₱1,927.84 more than the cost of maintaining the soldiers in our own hospital.

"During the month of October, up to the present date, the number of patients has been forty-nine or five hundred and eighty days; these at ₱2 per diem is ₱1,160. So far the twenty-three days of this month we would have to pay the Presbyterian Hospital almost twice as much as it took to maintain our sick and wounded during the past quarter."

Anent the closing of the district hospital, Colonel Taylor, under date of November 4, 1906, writes as follows:

"The only saving to be made in dispensing with the hospital would be rent and light. There were over 40 patients at one time last month. The Presbyterian Hospital or the Military hospital would, even if they could take care of our men, charge us far more than it costs us to maintain the hospital. I do not think the suggestion should be entertained."

HEALTH.

Under this caption the following tabulation is given:

Malaria	366
Diarrhea	70
Dysentery	53
Tuberculosis	45
Number of days lost in hospital	8,857
Number of days lost in quarters	3,437

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The health of the bureau has been good. The apparent improvement in the effective rate to total strength is to a certain extent no doubt due to the greater care in matters of hygiene and sanitation; but unquestionably the greatest factor is that the various companies have been gradually weeded of their weaklings and chronic invalids. The immature youths and recruits of inherited or acquired weakness of constitution have gradually, after repeated appearance on the sick report, been discharged from the service; and it is believed that the enlisted personnel now more nearly approaches the physical standard prescribed by existing regulations than at any previous period in the history of this organization.

As to the health of officers (American), it, too, has been good. More should take early advantage of accrued leave of absence. The fact has been well confirmed that even the most stalwart and robust after service of two or three years in the Tropics, largely lose energy, strength, and ambition. They perform what work duty demands more or less half-heartedly and with a draft on vital energy that can be actually felt at the time. Slight ailments to which a second thought would not be given in the United States are felt out of all proportion to their severity. No unimportant part of the work of the medical officer consists in treating and judiciously advising this class of cases.

In concluding this report, my last as an officer of the bureau, I desire to especially emphasize the importance of—

1. Filling without undue delay existing vacancies in the commissioned personnel.
2. Increasing the enlisted strength from 57 to 100.
3. Improving the equipment of hospitals.

One other timely recommendation: That upon my successor in office, for obvious reasons, the rank of major be conferred.

I have the honor to be, sir, very respectfully,

Your obedient servant, T. C. WALKER,
Superintendent, Medical Division.

The CHIEF SUPPLY OFFICER, BUREAU OF CONSTABULARY,
Manila, P. I.

OFFICE OF THE SUPERINTENDENT, MEDICAL DIVISION,
BUREAU OF CONSTABULARY,
Manila, P. I., July 15, 1907.

SIR: I have the honor to forward herewith a supplementary report for the months of May and June of the fiscal year ended June 30, 1907.

Accompanying this report is one by the ex-superintendent of the medical division from July 1, 1906, to April 30, 1907:

Supplies received from Capt. Thomas C. Walker, May 1, 1907	₱2,112.50
Supplies purchased May and June, 1907	3,414.86
Total	5,527.36
Supplies transferred May and June, 1907	2,021.27
	3,506.09
Rents and contingent expenses, April, May, and June	483.34
Amount paid out by district and provincial supply officers for medicines and medical treatment from July 1, 1906, to June 30, 1907	3,275.70

During the past two months requisitions have been sent to the bureau of supply for microscopes, sterilizers, emergency cases, and other articles that are necessary to fully equip the hospitals now in commission.

It was found advisable in the month of May to reopen the constabulary hospital at Catbalogan, Samar. This hospital is well supplied with medicines and surgical appliances, so that all of our sick and wounded men serving in that province can be taken care of by one of our own medical officers.

On June 30 there were two vacancies in the office of second lieutenant and medical inspector. A request has been made to the Bureau of Insular Affairs, at Washington, to fill these vacancies, but up to the present time nothing has been heard concerning them.

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Relative to the enlisted personnel, it is now up to its full strength allowed by act No. 1527, Philippine Commission.

The number of enlisted men are not adequate to meet the demands, as there are 100 companies of constabulary and only 57 enlisted men in the medical division. It can be seen at once that it is impossible to supply each company with a hospital corps man, which each company commander and senior inspector is constantly asking for. It is therefore respectfully requested that means be taken to increase the enlisted strength from 57 to 100 men.

The health of the bureau for the past two months has been excellent; there has been no epidemic of dysentery, typhoid, smallpox, or other dangerous communicable diseases. The percentage of venereal diseases is small. All this is no doubt due in a great measure to the better sanitary supervision of the commands by the company commanders and other officers of the line.

Deaths from disease during the past year were about 10 per 1,000. This is quite a remarkable showing when the death rate among Filipinos in Manila during the past quarter was 30.71 per 1,000.

Enlisted men killed during the year 1906–7	28
Enlisted men wounded during the year 1906–7	30
Enlisted men died during the year 1906–7	41
Officers killed during the year 1906–7	1
Officers wounded during the year 1906–7	1
Officers died during the year 1906–7	1
Total	102

Respectfully submitted.

SAMUEL C. GURNEY,
Superintendent, Medical Division.

The CHIEF SUPPLY OFFICER, BUREAU OF CONSTABULARY,
Manila, P. I.

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APPENDIX B.

REPORT OF THE SUPERVISING RAILWAY EXPERT.

OFFICE OF THE SUPERVISING RAILWAY EXPERT,
Manila, July 1, 1907.

SIR: I have the honor to submit my annual report of the work of this office for the year ended June 30, 1907.

ORGANIZATION OF OFFICE.

The work of the general force during the year has consisted largely of examinations of proposed routes of railroad lines to be constructed by the Manila Railroad Company under act No. 1510, and by the Philippine Railway Company under act No. 1497.

The following constituted the staff during the fiscal year: Mr. F. A. Molitor performed the functions of supervising railway expert from July 1, 1906, to March 31, 1907, having resigned, taking effect on the latter date.

Mr. L. F. Goodale assumed charge of the office as supervising railway expert on April 16, 1907.

FIELD FORCE.

A field force has been employed only in the inspection of the railways being constructed by the Philippine Railway Company on the islands of Cebu, Panay, and Negros.

It was probably the original intention to have this field force consist of one inspecting engineer on each island where the work of construction was being carried on. No regular field force was employed however until the latter part of December, 1906. This force was gradually increased as available men were found.

By resolution of the Commission of February 25, 1907, there was contemplated "a system of rigid inspection by the supervising railway expert and his staff," of the work of construction on the first section (20 miles) of railway on Panay and the first section (20 miles) on Cebu.

The idea was to keep a check on the number of laborers, mechanics, foremen, etc., employed on each item of construction and also a check on the amount of material going into each bridge, culvert, building, etc.

The reports of such check and inspection were to be sent to this office for compilation and entry in the records, from which it was intended to evolve a table of costs of each piece of work, such as bridges, culverts, station buildings, water tanks, tool houses, roundhouses, etc., as per classifications prescribed by the Interstate Commerce Commission.

Labor reports have been received and compiled up to and including June 14, 1907, but as the work had gotten barely started, and as it was impossible to obtain the results desired without the employment of a much larger and more expensive force, the idea was abandoned.

Prior to and under the resolution of February 25 above referred to, the following staff was employed at different times, as shown:[a]

On June 15, 1907, with the approval of the Governor-General, the detailed inspection and timekeeping was discontinued. This action was afterwards confirmed by resolution of the Commission on July 3, 1907.

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[a] A table showing personnel has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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The release of timekeepers and inspectors left one inspecting engineer and two stable boys as the force of the government on each of the islands of Panay and Cebu on June 30, 1907, and this force will be continued unless need arises for a change.

The appointment of the three inspecting engineers from the United States under resolutions of the Commission of February 26, 1907, was made by cable through the Bureau of Insular Affairs. These engineers are exempt from civil service requirements, but receive full pay from date of leaving their place of residence in the United States en route to Manila, and are reimbursed for their actual and necessary traveling expenses to and from Manila. This is in lieu of leave and other privileges provided for civil service employees.

Report in detail of the various transportation companies follows:

MANILA RAILROAD COMPANY.

This company is the successor of the Manila Railway Company (Limited), an English corporation whose original charter or concession was granted by the Spanish authorities of the Philippine Islands on January 21, 1887, and covered the line from Manila to Dagupan, a distance of 196 kilometers, which was first put into operation in 1892.

No further concessions were granted to this railway company until 1902, when the Philippine Commission by act No. 554 of December 8, 1902, amended by act No. 704 of March 27, 1903, and confirmed by act No. 1510 of July 7, 1906, conferred on the Manila Railway Company (Limited) the right to construct a branch railroad from Guiguinto to Cabanatuan, a distance of 91 kilometers, which was put into operation for its total length on December 18, 1905.

Acts No. 555 of December 8, 1902, amended by act No. 705 of March 27, 1903, and act No. 879 of September 9, 1903, granted the same railway company the right to construct branches from its main line in the town of Mabalacat, Province of Pampanga, to Camp Stotsenberg, a distance of 7.2 kilometers; this line was put into operation on May 15, 1903.

The same acts authorized the construction of a line 1.6 kilometers in length, from a point on the main line in the town of Bayambang to Camp Gregg. This line was never constructed, as it was considered unnecessary by the military authorities.

A concession for the construction of a line from Manila to Antipolo, a distance of approximately 32 kilometers, was granted by act No. 703 of the Philippine Commission on March 27, 1903, and confirmed by act No. 1510, July 7, 1906. This line was put in operation to Taytay, a distance of 23 kilometers, on April 28, 1906, and the work of completing it to Antipolo is still in progress.

Under the provisions of secs. 4 and 5 of the act of Congress approved February 6, 1905, known as the Cooper act, proposals for concessionary grants to construct, equip, maintain, and operate certain lines of railroad in the Philippine Islands were invited, and after long negotiations carried on by the honorable the Secretary of War, on the part of the Philippine government, and the parties interested, a concession was granted to Speyer & Co., of New York and London, for the construction of approximately 675 kilometers of railroad on the island of Luzon.

On July 3, 1906, Speyer & Co. assigned the concession to the Manila Railroad Company, a corporation of the State of New Jersey, the articles of incorporation being filed on June 6, 1906.

In conformity with the award of the honorable the Secretary of War, the Philippine Commission by act No. 1510 on July 7, 1906, granted to the Manila Railroad Company the right to construct, equip, maintain, and operate in perpetuity the following lines of railroad:

"A concession for the existing lines of the Manila Railway Company (Limited), and branches therefrom, as follows: From Manila, or from a point on the Manila-Antipolo line to Cavite and Naic, 29 miles (46.7 kilometers); from San Fernando to Florida Blanca, 14 miles (22.5 kilometers); from Dau to San Pedro Magalang, 9 miles (14.5 kilometers); from San Miguel to La Paz, 10 miles (16.09 kilometers); from Panique to Tayug, 28 miles (45.06 kilometers), and to complete, maintain, and operate the branches of the Manila-Dagupan line, now in course of construction, to Antipolo and Cabanatuan.

"A concession for a branch from the Manila-Antipolo line, now under construction, to continue the line, now authorized to Mariquina, from Mariquina to Montalban, an estimated distance of 8 miles (12.9 kilometers).

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"A concession for a line from Manila, or from a point on the Manila-Antipolo line, to Batangas and Bauan, an estimated distance of 73 miles (117.4 kilometers), and for a branch therefrom from Calamba to Santa Cruz, an estimated distance of 22 miles (35.4 kilometers), with the right to extend such branch for a farther distance of about 5 miles (8.04 kilometers) for the purpose of extending the line to or building via Magdalena and Pagsanjan, and for a branch from Santo Tomas to Lucena, an estimated distance of 39 miles (62.76 kilometers), with the right to extend the same from Lucena, a farther distance of about 8 miles (12.9 kilometers), to a point on the coast at which the government may decide to construct a harbor.

"A concession for a line from Pasacao to Legaspi, an estimated distance of 72 miles (115.8 kilometers), and for branches from such line from Pili to Lagonoy, an estimated distance of 31 miles (49.9 kilometers), and from Ligao to Tabaco, an estimated distance of 21 miles (33.8 kilometers).

"A concession for a line from a point near Dagupan to Camp No. 1, in the direction of Baguio, an estimated distance of 25 miles (40.23 kilometers).

"A concession for a line northward from Dagupan to San Fernando, an estimated distance of 35 miles (56.33 kilometers)."

Subsection 15, of section 1, of act No. 1510, provides that:

"In consideration of this concession, and the waiver by the Philippine government of all claims against said Manila Railway Company (Limited), based on the Spanish concession, the said Manila Railway Company (Limited) shall fully release all claims against the United States, the government of the Philippine Islands, and the provinces and municipalities thereof, based on the terms of the concession granted by the Spanish Government to the Manila Railway Company (Limited); and also all claims growing out of the use and occupation of the lines of said Manila Railway Company (Limited) by the military authorities of the United States, and out of the damage to said lines, accessories, and equipment resulting during such use and actual occupancy, and especially the claim against the United States for $1,515,000 gold, presented by the British ambassador to the Department of State of the United States on behalf of the said Manila Railway Company (Limited); and this concession shall not take effect as to the lines of the Manila Railway Company (Limited), including the branches thereof to Antipolo and Cabanatuan, until the grantee shall have presented to the Secretary of War a release and waiver of the claims aforesaid in form acceptable to the Secretary of War, duly executed by the proper officers of the Manila Railway Company (Limited), thereunto lawfully authorized by said company, and upon such release and waiver being given in a form binding on all holders of lien under any mortgage, deed of trust, or other instrument heretofore executed by said Manila Railway Company (Limited), the Spanish concession above referred to shall be deemed to be canceled."

The "waiver" required under the provisions of the above section was duly submitted by the Manila Railway Company (Limited), and approved and accepted by the honorable the Secretary of War on April 24, 1907, so that the property of the Manila Railway Company (Limited) came into the possession of the Manila Railroad Company as of said date, and the Spanish concession canceled.

On June 30, 1907, approximately 340 kilometers of the line had been finally located and approved by the Governor-General, and construction work had progressed as follows:

	Kilometers.
Dagupan-San Fernando (Union) line:	
Grading completed for	12.5
Rails laid for	10.5
San Fabian-Camp One line. Grading completed for	10.5
Dao-San Pedro Magalang line:	
Grading completed for	9
Rails laid for	4.5
San Fernando-Florida Blanca line:	
Grading all completed	24.52
Rails laid for	8
Mariquina-Montalban line. All construction work completed and line put in operation April 17, 1907.	
Paco (Manila-) Batangas line, grading completed for	38

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	Kilometers.
Belt line (Manila):	
Grading completed for	6
Rails laid for	.4
Cavite short line, from Paco (Manila) to Cavite. Grading completed for	15

Satisfactory progress is being made on the remainder of the surveys, and there is no doubt of the completion of the lines within the time provided in the act.

Statistics in regard to the operation of this railroad, with equipment used and length of line operated in 1905 and 1906, are as follows:

Length of line, territory covered.	Main line.	Sidings.	Main line.	Sidings.
Main line, Manila to Dagupan kilometers	196		196	
Cabanatuan branch, Bigaa to Cabanatuan, kilometers	91		91	
Antipolo branch, Manila to Taytay kilometers	16	Not given.	29	Not given.
Mariquina branch, Maraquina to Montalban, kilometers				
Stotsenberg branch to Camp Stotsenberg, kilometers	7		7	
Total	310		323	

The increase in length of line during the year was: Antipolo branch, Manila to Taytay, 13 kilometers; Mariquina branch, Mariquina to Montalban, 13 kilometers.

The average length of line during the year 1906 was 320 kilometers.

TOTAL REVENUE FROM TRANSPORTATION AND OPERATION OTHER THAN TRANSPORTATION.[a]

	1905.	1906.
Freight revenue	₱783,840.69	₱747,713.75
Passenger revenue	1,012,347.08	1,182,755.14
Mail revenue	1,834.45	4,513.48
Government transportation	79,882.53	121,298.56
Switching revenue	25,146.74	23,999.22
Storage of freight	409.79	49.14
Rent of buildings and property	12,664.77	7,750.76
Total	1,916,126.05	2,038,075.05

In addition, the revenue from station and train privileges was ₱707.77 during the year 1906.

TOTAL OPERATING EXPENSES.

[Statistics for 1905 not complete.]

	1906.
Administration	₱59,196.31
Transportation	210,125.99
Telegraph	16,210.91
Maintenance of equipment	296,360.61
Maintenance of way and structures	253,685.93
Registration of lands and internal revenue	16,625.42
Miscellaneous	19,018.62
Operating expenses Stotsenberg and Port line	26,004.96
Total	897,228.75

The operating expenses of the main line during the year 1905 were ₱631,810.35.

Total operating revenue	₱2,038,075.05
Total operating expenses	897,228.75
Net operating revenue	1,140,846.30

Percentage of operating expenses to operating revenue, 44 per cent.

[a] Tables showing revenues and expenses in detail have been omitted, and are on file in the Bureau of Insular Affairs, War Department.

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TAXES.

	1906.
Main line	₱6,791.94
Cabanatuan branch	4,401.37
Antipolo branch	
Mariquina branch	1,712.16
Stotsenberg branch	
Total	12,905.47

Net operating revenue	₱1,140,846.30
Less taxes	12,905.47
Operating income	1,127,940.83

Gross operating revenue per kilometer of road	₱6,369.00
Operating expenses per kilometer of road	2,804.00
Net operating revenue per kilometer of road	3,565.00

Rail was relaid on 11.3 kilometers of the main track, 29½-kilogram rail replacing 21-kilogram rail, and about the same length of track was reballasted.

The temporary pile bridge over the Peñaranda River was replaced by ten 30.5-meter spans of steel-lattice bridge.

The equipment on this line consists of 17 passenger engines, 18 freight engines, 19 first and second class cars, 10 second-class cars, 60 third-class cars, 1 inspection car, 717 freight cars, and 45 miscellaneous cars.

During the year the Antipolo line was opened for traffic to Taytay.

The following general information is added:

Revenues.	1905.	1906.
Passenger revenue, per train kilometer	₱2.2108	₱2.0922
Freight revenue, per train kilometer	2.80547	2.7318
Average amount received for carrying passenger 1 kilometer	.0206	.0209
Average amount received from each passenger	.6162	.62871
Passenger revenue, including mail and miscellaneous, per kilometer of road		3,579
Freight revenue, including switching, storage, and miscellaneous, per kilometer of road		2,790
Average amount received for each metric ton of freight	2.70424	2.48378
Gross earnings from operation, per train kilometer	2.43737	2.23101
Operating expenses, per train kilometer	.97839	.91483

AVERAGE HAUL.

Passengers	kilometers	29.86	30.06
One metric ton freight	do	88.08	81.65
Passengers hauled 1 kilometer	number	43,509,359	41,119,565
Metric tons freight carried 1 kilometer	tons	21,688,276	19,842,832

Accidents during the year were: 31 Class A, serious; 18 Class B, not serious; 44 Class C, minor.

The reduction of earnings during the year 1906 as compared with the previous year on the main line was on account of shortage of crops.

The earnings during the first half of the year 1907 indicate that this year will give better results on all lines than either 1905 or 1906.

MANILA ELECTRIC RAILROAD AND LIGHT COMPANY AND MANILA SUBURBAN RAILWAYS COMPANY.

Act No. 484 of the Philippine Commission, enacted October 20, 1902, empowered the municipal board of the city of Manila to grant a franchise for the construction, maintenance, and operation in the streets of Manila and its suburbs of an electric street railway and an electric light, heat, and power system.

Under the above authority the municipal board received bids, and by resolution on March 7, 1903, awarded the franchise to Mr. Chas. M. Swift, which was approved by the Philippine Commission on March 9, 1903.

The franchise was granted Mr. Swift on March 24, 1903, by ordinance No. 44 of the municipal board, and on March 27, 1903, he assigned the same to the

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Manila Railway and Light Company, a corporation organized under the laws of the State of New Jersey. On July 6, 1903, the name of this company was, by due process of law, changed to the Manila Electric Railroad and Light Company, and the corporation is now so known.

This company was authorized on April 11, 1904, by act No. 1112 of the Philippine Commission, to acquire the properties of the existing street-car lines, then known as the Compañia de los Tranvias de Filipinas, which were constructed under grants of the general government of the Philippine Archipelago to Señor Don Jacobo Zobel and Señor Don Lucio M. Bremon on April 22, 1881, and October 22, 1884. Act No. 1112 also provided, in section 10 thereof, that the Manila Electric Railroad and Light Company should file its acceptance of the terms of act No. 1112, and surrender the franchises, including amendments thereto, of the Compañia de los Tranvias de Filipinas.

Said acceptance and surrender were filed on April 14, 1904, and November 4, 1904, respectively, and the municipal board on December 27, 1904, in accordance with directions to it contained in act No. 1112, enacted ordinance No. 70, amendatory of ordinance No. 44.

The Manila Electric Railroad and Light Company also operates the Manila Suburban Railways Company's lines, and both companies are officered by the same persons—otherwise they are separate entities.

On January 30, 1906, by act No. 1446, amended by act No. 1589, of February 1, 1907, the Philippine Commission granted to Charles M. Swift a franchise covering the construction, maintenance, and operation of an electric railway and of an electric heat, light, and power system from Paco (Manila) to Pasig, in the Province of Rizal, a distance of 9.8 kilometers.

In accordance with act No. 1446, of January 30, 1906, this franchise was assigned by Mr. Swift, on July 20, 1906, to the Manila Suburban Railways Company, a corporation of the State of Connecticut, incorporated July 5, 1906.

In act No. 1589 of the Philippine Commission, of February 1, 1907, the time for completion of the line to Pasig was extended from July 30, 1907, to January 30, 1908, and the railways company was, among other things, granted a franchise for an electric line from a point on its present line near San Pedro Macati to the town of Taguig and the Laguna de Bay, a distance of 9.65 kilometers.

That portion of the line from Paco to Pasig between the former point and Fort McKinley was opened for operation on April 18, 1907, and the construction of the remainder of the line to Pasig is well under way and will be completed within the time required by the act. Surveys only have been made for the line to Taguig and the Laguna de Bay.

The operations of the Manila Electric Railroad and Light Company for the past fiscal year follows:

MANILA ELECTRIC RAILROAD AND LIGHT COMPANY, YEAR ENDED JUNE 30, 1907.

Length of line		45.4 kilometers
(a) Length of double track		12.7 kilometers
(b) Length of single track		32.8 kilometers
(c) Length of sidings		5.95 kilometers
Revenue from transportation		₱967,712.58
Revenue from operation other than transportation		45,031.10
Total operating revenue		1,012,743.68
Operating expenses:		
(a) Maintenance of way and structures	₱32,896.26	
(b) Maintenance of equipment	71,506.87	
(c) Traffic expenses		
(d) Transportation expenses	315,729.94	
(e) General expenses and taxes	109,193.28	
Total operating expenses and taxes		529,326.35
Net operating revenue		483,417.33
Per cent of operating expenses (including taxes) to operating revenue		52 per cent
Betterments—new sidings constructed past year:		
(a) One on Santa Ana line		76.2 meters
(b) One on Malabon line		103.66 meters

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The following general information:

(a) Total number of passengers carried	10,259,297
(b) Average earnings per passenger	₱0.098
(c) Average expense per passenger	₱0.051

(d) Equipment consists of 111 motor cars, 1 freight car, and 1 wrecking car.

MANILA SUBURBAN RAILWAYS COMPANY.

No report of the operation of the Manila Suburban Railways Company has been received for the last two months of the year ended June 30, 1907, during which about 8½ kilometers of this line were in operation.

DAET AND MERCEDES TRAMWAY.

This tramway was constructed under authority of act No. 1111 of April 8, 1904, which granted to Charles W. Carson the right to construct a 0.91-meter gauge tramway 7.24 kilometers in length from Daet to Mercedes, its port in Ambos Camarines. The line was put into operation February 1, 1905, animal power being used.

Freight handled during the year ended June 30, 1907, was: 13,832 packages merchandise; 42,735 sacks rice; 18,243 bales hemp; 4,136 bales loose hemp; 5,394 demijohns vino; 57 cars firewood; 31 cars stone.

Total freight hauled	5,066 metric tons
Total gross revenue	₱23,092.33

TARLAC RAILWAY COMPANY.

Act No. 1448 of February 1, 1906, granted to Walter E. Olsen a franchise for the construction of a railway from Paniqui, on the line of the Manila Railroad, westwardly to Camiling, a distance of about 20 kilometers. On June 13, 1906, the franchise was transferred by him to the Tarlac Railway Company, a corporation of the Philippine Islands.

This line, under the franchise, should have been completed April 4, 1907, but owing to scarcity of labor and materials the time for completion was extended by the Commission to June 4, and later to August 4, 1907.

On June 30 the line was practically 90 per cent done. When put in operation it will serve a productive rice country and become an important feeder to the Manila Railroad. Gauge of track built is 1.07 meters.

PHILIPPINE RAILWAY COMPANY.

Act No. 1497, enacted May 28, 1906, granted authority to the Philippine Railway Company, a corporation organized under the laws of the State of Connecticut, to locate, construct, furnish, maintain, and operate, under government guaranty of interest on bonds to be issued, the following lines of railway:

"*On the island of Panay.*—A line from Iloilo, in the province of Iloilo and island of Panay, in a northerly direction, forking to the town of Capiz and to a terminal on the Bay of Capiz and to the town of Bataan, on the north coast of the island of Panay, in the province of Capiz, a distance, approximately, of 100 miles (160.9 kilometers).

"*On the island of Negros.*—A line in the island of Negros, from the harbor of Escalante, on the northeast coast of said island westerly, following the coast line to Himamailan, a distance, approximately, of 100 miles (160.9 kilometers).

"*On the island of Cebu.*—A line in the island of Cebu, running north from the city of Cebu to Danao, on the east coast, and south from Cebu to Argao, on the east coast, with the option to the grantee of a line across the island from Carcar or Sibonga to the west coast, and thence along the coast between Dumanjug and Barili, a distance approximately of 95 miles (152.8 kilometers)."

This grant was made in accordance with the provisions of sections 4 and 5 of the act of Congress approved February 6, 1905, under the conditions of which proposals had been received of William Salomon & Co., Cornelius Vanderbilt, J. G. White & Co. (Incorporated), and Charles M. Swift, with whom were associated the International Banking Corporation, H. R. Wilson and Heidelbach, Ickelheimer & Co., for the concession and authority to construct, equip, maintain, and operate lines of railroad in the Philippine Islands, as set forth above.

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The proposal was accepted on January 24, 1906, and award made to above-named bidders, who, on March 8, 1906, duly assigned said franchise to the Philippine Railway Company, a corporation of the character and qualifications specified in the invitation for proposals issued by the honorable the Secretary of War on June 12, 1905, which invitation was modified and amended by the circular of the Secretary of War dated December 22, 1905.

The work of location and construction of the lines authorized as above is progressing satisfactorily, considering the difficulties necessarly encountered by the engineering and constructing forces in a new country with no common language, with untrained labor, with lack of transportation, and with difficulty in obtaining materials.

The engineering forces of this company arrived on the ground June 8, 1906.

Work of surveying was begun:	
On the island of Cebu	June 16, 1906
On the island of Negros	June 20, 1906
On the island of Panay	June 21, 1906
Grading in a small way was begun:	
On the island of Panay	November 14, 1906
On the island of Cebu	November 17, 1906
Rail laying was begun:	
On the island of Cebu	December 15, 1906
On the island of Panay	April 1, 1907

No grading has yet been done on the island of Negros.

At the end of the fiscal year the grading was practically completed from Cebu to Danao and from Cebu to Minglanilli, a total distance of 45 kilometers, on the island of Cebu; and from Iloilo to near Pototan, a distance of 28.97 kilometers, on the island of Panay; rail was laid 7.4 kilometers north and 8.7 kilometers south of Cebu, a total of 16.1 kilometers, on the island of Cebu, and 4.8 kilometers from Iloilo to Jaro, on the island of Panay.

Hardly more than a start on the bridge and culvert work, on either of the islands where construction work has begun, has been made.

The final location of the first 32.2 kilometers on the island of Cebu, from Cebu to Danao, was approved by the governor-general on December 12, 1906, and the second 32.2 kilometers, from Cebu to Carcar, on April 27, 1907.

The first 32.2 kilometers of line on the island of Panay, from Iloilo to Pototan, was approved by the governor-general on December 12, 1906.

On June 30, 1907, all of the lines covered by the concession were finally located, except about 64.4 kilometers in northern Negros, where only preliminary lines have been run.

Final plans of the location under the act were due for presentation to the goverment for approval on April 14, 1907. This time has been extended by the governor-general, except as to the first 32.2 kilometers on the islands of Panay and Cebu, to August 14, 1907.

The Philippine Railway Company, by direction of the governor-general, is required to complete and put in operation 160.93 kilometers of line during the year ending March 14, 1908; 160.93 kilometers during the year ending March 14, 1909, and the remainder during the year ending March 14, 1910.

It seems probable that the railway company will find it necessary to ask for an extension of the time for completion of the first 160.93 kilometers at least.

The building of the railroad lines by this company is being handled, in my opinion, in a satisfactory manner, and while the first cost of the roads will exceed by considerable the preliminary estimates made in the United States and before definite surveys were made, this can only be reduced at the expense of future increased cost of maintenance and operation.

OFFICE EXPENSES.

The expenses of this office during the fiscal year were ₱75,830.89, and of this amount ₱56,461.98 were chargeable to Philippine railway supervision and the remainder, ₱19,368.91, to general expenses.

Yours truly,

L. F. GOODALE,
Supervising Railway Expert.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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APPENDIX C.

REPORT OF DIRECTOR OF PUBLIC WORKS.

OFFICE OF THE DIRECTOR OF PUBLIC WORKS,
Manila, July 1, 1907.

SIR: I have the honor to submit herewith the annual report of the operations of the bureau of public works for the fiscal year ended June 30, 1907.

ROAD CONSTRUCTION.

The subject of roads and bridges continues to demand a large proportion of the resources of this bureau. Road construction and maintenance have been an important educational problem. The provinces and municipalities are steadily advancing in the proportional amount of revenues expended on highways and in providing for permanent types of construction. The increasing interest of the municipalities in this subject and in other public works merits special mention. They are practicing to a considerable extent the policy defined by the secretary of commerce and police relative to permanent construction and are beginning to divert available funds to public works of a durable, permanent type. If the anticipated progress continues the problem of road maintenance will be practically settled.

The insular government has provided the local governments with ways and means for road work and has placed upon them to a larger degree the responsibility of financing such works. Additional to "the Philippine road law," enacted last year, act No. 1617 provides for a system of tolls on roads and bridges maintained wholly or in part by provincial funds, rates of toll being subject to the approval of the Governor-General. Act No. 1652 authorizes provincial boards to increase the amount of the cedula from 1 to 2 pesos for the succeeding calendar year, and act No. 1653 provides for the acceptance of the provisions of "the Philippine road law" by any municipality upon the affirmative vote of the municipal council. The funds or labor derived through the provisions of these acts are applicable only to the construction and maintenance of roads and bridges.

The roads of the Philippines are subject to the destructive attack of an excessively dry season and of a torrentially rainy season. Their maintenance has been irregular, ineffective, and without any organized system, and since the cessation of the rigorous Spanish road laws they have fallen into an unsatisfactory condition entailing undue expense on all transportation and preventing a proper development of agricultural interests. Existing laws do not permit a uniform control of road maintenance accomplished by the municipalities or provide revenues sufficient for such purposes. The problem is intensified by the frequent changes in the personnel of provincial and municipal officials, and although a few provinces have in part adopted the caminero system of road maintenance recommended by the secretary of commerce and police, yet an effective solution of this important problem of maintaining roads in a continuous and satisfactory manner can not be attained until revenues are increased and insular supervision is established.

The following tabulation shows, tentatively, the extent of roads in the Philippines and the estimated cost of reconstructing them in a reasonably permanent manner, exclusive of the provinces of Palawan and Romblon and the Moro Province:

	First class.	Second class.	Third class.	Total.
Total kilometers	3,287	4,218	14,736	22,241
Average per 100,000 hectares	15.7	20.2	70.5	106.4
Estimated cost per kilometer	₱7,500	₱3,000	₱600	
Total estimated cost	₱24,652,500	₱12,654,000	₱8,841,600	₱46,148,100

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The following tabulation shows insular appropriations for the construction of fourteen important roads, aggregating a total length of 510 kilometers, during the year cited, and exclusive of appropriations for the Benguet road:

Fiscal year.	Congressional relief fund.	Insular funds or improvement bonds.	Total.
1904	₱1,335,600		₱1,335,600
1905	99,700	₱87,000	186,700
1906	60,000	84,600	144,600
1907		130,000	130,000
Total	1,495,300	301,600	1,796,900

The following tabulation shows provincial expenditures (exclusive of municipalities) for roads and bridges, compiled from the annual reports of the auditor for the years cited, except for the year 1907, which is subject to correction. For comparative purposes the amounts shown in the auditor's reports for the fiscal years 1902, 1903, 1904, and 1905 have been reduced to Philippine currency at the arbitrary rate of Pfs. 1=$0.50=₱1.00.

Fiscal year.	Total.	Congressional relief fund.	Difference.
1902	₱199,995.90		₱199,995.90
1903	465,376.23		465,376.23
1904	1,228,847.95	₱619,314.21	609,533.74
1905	895,037.11	289,145.91	605,145.91
1906	700,018.52	222,788.96	477,229.56

These funds have not been expended on the improvement and maintenance of roads in accordance with a comprehensive study of a road system, but too frequently to meet the immediate needs of a community, resulting in the necessity of a similar expenditure the succeeding season.

An analysis of the amounts clearly indicates that a possible and reasonable increase in both insular and local expenditures under systematic supervision can attain, within a few years, to a system of practical and durable roads throughout the islands.

INSULAR ROADS.

The appropriations heretofore mentioned by the insular government have been made mainly for the construction of 14 important new roads. Practically none of these roads are satisfactorily completed, and there remain to be constructed before they can be turned over in equity to the province to maintain: First, many permanent bridges to replace temporary timber structures which were erected from the most available timber in order to make these roads passable at the earliest possible date; second, the surfacing of portions of these roads in order to attain to a first-class roadbed passable throughout the rainy season.

The total expenditure thereon during the fiscal year was ₱126,657.70, mainly on the Cebu-Toledo road, the Pagbilao-Atimonan, the Bay-Tiaong, and the Wright-Taft roads. The district engineers of the provinces in which these roads are located have had charge of the construction work. The insular government probably will be required to provide the larger portion of the maintenance expenses of a few of these roads located in the poorer provinces.[a]

[a] Money statements showing the financial condition of all of these roads on which expenditures have been made during the past year, and a table showing the principal data in connection with the most important of these roads, additional work required, and the estimated amount necessary to complete satisfactorily these roads before turning them over to the provinces for maintenance have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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SAN MIGUEL DE MAYUMO-SIBUL SPRINGS ROAD, BULACAN.

A survey was authorized by the Governor-General under date of June 5, 1906, in order that provision might be made for the reconstruction of a road that had formerly existed between San Miguel de Mayumo, a barrio on the Cabanatuan branch of the Manila Railway Company, and Sibul Springs, making accessible the springs at Sibul, noted for their medicinal value during Spanish days.

Mr. R. B. Tufts, assistant engineer, was detailed to this work on July 15, 1906. A reconnoissance was made of the two most feasible routes. The survey was completed on August 1, at an approximate cost of ₱450. He estimated that approximately ₱41,000 would cover the cost of constructing the road and necessary structures.

Under date March 15, 1907, the Philippine Commission authorized the director of public works to advertise for a period of twenty days for proposals for the construction of the San Miguel de Mayumo-Sibul Springs road, in accordance with the plans and specifications which had been prepared and submitted. On March 22 bids were advertised for and opened on April 10 in the presence of the competitive bidders.

This method of constructing roads by contract under rigid specifications marks a radical departure from previous methods, and the local contractors manifest considerable interest therein.

In accordance with a resolution of the Commission, dated April 24, the secretary of commerce and police awarded the contract to C. W. Mead & Co. for the sum of ₱38,875. The contract was executed May 2. Mr. Max Dobbins, assistant engineer, was designated as engineer in charge of the construction of the proposed road and established headquarters at San Miguel on May 14, on which date preliminary work was started by the contractor. Active work on grading was commenced May 27, and the work has progressed favorably since that date, with but few interruptions on account of rain.

The contract called for the suspension of work from June 1 to September 30. The contractor, however, requested permission to continue with the construction of the road at his own risk, and under the condition that he pay the cost of superintendence he was permitted to proceed with same.

In the barrio of Kamias it was found that 30 nipa houses were located on the 20-meter right of way. The necessity of moving them, in order that a suitable street might be established, was pointed out to the people, and the matter was amicably settled and the encroaching houses were removed without serious delays.

The contractor has had an average force of—

40 laborers at	₱0.50	per day.
3 capatazes at	1.50	per day.
3 drivers at	.60	per day and subsistence.
3 Americans at	175.00	per month and subsistence.

Estimate of work accomplished:

Clearing and grubbing 0.6 hectares	₱100.00
Embankment, 2,050 cubic meters	1,435.00
Gravel surfacing, 60 cubic meters	403.00
Total	1,838.00

Tabulation C submitted herewith shows the engineer's estimates of quantities, the lump-sum bids, and the supplementary unit-price bids for use in possible modifications of quantities.[a]

BENGUET ROAD AND BENGUET IMPROVEMENTS.

The superintendence of the Benguet road was under the immediate control of the provincial governor of Benguet, Mr. W. F. Pack, up to December 15, 1906. Mr. R. K. West, assistant engineer, was then appointed acting superintendent, and has had immediate charge of the work throughout the remainder of the fiscal year.

The traffic over this road during the past season has been unprecedented, owing to the passenger traffic, the transportation of mining and milling machinery, the building of residences at Baguio, and the development of Camp John Hay by the military.

[a] Omitted and filed in the Bureau of Insular Affairs, War Department.

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During the rainy season of 1906 the road was closed for short intervals of only a few hours' duration. However, the upper unsurfaced portion of the road through the clay slopes from Camp 7 to Baguio was almost impassable on account of the deep mud. A soft roadbed also impeded traffic on the lower portion of the road where it had not been surfaced. The work of surfacing the upper part of the road was begun in October, 1906. There have been surfaced with gravel 685 linear meters, and with broken stone 2,651. On the lower portion of the road there have been placed 2,916 cubic meters of gravel. Of parapet walls 2,316 linear meters have been built, of which 792 have a section of 0.232 square meters and 5,524 a section of 0.209 square meters. These parapet walls have prevented some possibly serious accidents and also afford a sense of security to the traveling public.

Nine bridges aggregating a length of 95 meters have been rebuilt, on which were used 18,385 feet B. M. of new and 10,400 feet B. M. of old lumber. Seventeen small bridges or box culverts below the Baguio boundary line have been repaired, and this portion of the road may be, in equity, turned over to the province of Pangasinan for future maintenance. Six short-span bridges have been replaced by reenforced concrete slab floors. The timber floors of the small masonry structures are also being replaced by concrete slabs as rapidly as extensive repairs are neded. Five half bridges have been replaced by rubble masonry walls, and it is desired to replace the remaining 14 half bridges in the same manner during the coming year.

On the suspension bridges all head blocks were renewed. Various minor repairs have been made to the floor system, towers, and hangers. The cables are in a fair condition. All timber work in these bridges will need renewal in the near future, unless the bridges are replaced with permanent structures.

The caminero system was started in October, over 27 kilometers of road, with 2 laborers assigned to each 1.6 kilometers or section. Houses were built for the camineros and their families, and steadier and more efficient labor has been the result. This system was extended to the portion of the road above Camp Four, but with only one man to a section of 0.8 kilometer. When the road is completely surfaced and in good condition, the caminero system will show greater efficiency and economy in the maintenance of this road.

The bullocks remaining on hand the previous year were turned over to the bureau of agriculture, as they were no longer useful as a means of transportation. In lieu of these bullocks 6 mules and 4 Chinese ponies were purchased and better transportation facilities secured.

A 4-ton road roller was shipped to the road in April, and used in connection with the surfacing on both the lower and upper ends of the road.

Surveys were commenced in February for the purpose of securing data on which to base designs and estimates of the cost of replacing the temporary suspension bridges and several smaller bridges with steel structures. These surveys were completed in May, and the necessary designs, plans, estimates, and specifications are now in progress. The work has been advanced sufficiently to show that 9 large bridges aggregating a total length of 547.3 meters, the largest span of which is 79.24 meters, and 7 smaller bridges aggregating a total length of 144.78 meters will be required at the earliest practicable date and that 24 small bridges aggregating a total length of 396 meters should be replaced with permanent steel or reenforced concrete structures within a couple of years, making a total of 40 proposed permanent bridges which should be replaced with steel or reenforced concrete structures on account of the anticipated failure of the present temporary ones. The loading, on which designs for the above proposed bridges have been based, is equivalent to 2 tandem 40-ton electric cars; the general type of bridge is a deck truss, or a plate girder; the floor systems are uniform as fully as is practicable and the use of ipil flooring is proposed.

The expenditures during the fiscal year on the maintenance of the Benguet road amounted to ₱93,732.57, of which ₱84,916.55 were from funds appropriated to this bureau and ₱8,816.02 from Benguet improvements, general fund, accruing from sales of property and supplies. Of this amount, ₱4,562.56 were paid on account of bills incurred during the fiscal years 1904, 1905, and 1906.

Benguet improvements were under the immediate supervision of Mr. G. H. Guerdrum, assistant engineer, from July 1, 1906, to February 28, 1907, and under Mr. Wm. M. Haube, assistant engineer, for the remainder of the year. The duties pertaining to this office are numerous, consisting of topographical, road, and town-lot surveys, the setting of grade stakes for road construction, location of roads and trails within the province upon the request of the provincial governor, inspection of construction of government buildings, the cus-

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todianship of all government buildings, and the execution of repairs required on same.

The principal items of work accomplished were: A survey for the purpose of increasing the Baguio town-site reservation to include certain lands in or near the barrio of Pakdal which were suitable for building sites. This was completed and the plan forwarded in August, 1906. In order that water suitable for drinking purposes might be available for the guests at the hotel and the residents at Baguio, a location, survey, and temporary construction of a new road to the "big spring" was completed, to enable the use of the spring during the summer season; permanent construction will follow at the close of the rainy season. A location and survey of a road approximately 1,372 meters in length known as the "Mirador road," on the property of the Jesuit mission, was made in April, the estimated cost of which was about ₱7,000 and, pending definite decision by the order of Jesuits regarding the construction of same, the existing trail was widened, so as to allow transportation to reach the site of the cottages. Preliminary lot surveys in Baguio town-site have been carried on under instructions given by the consulting architect, and when approved are turned over to the bureau of lands for final surveys and the necessary action as to the disposition of the lots. Road surveys within the Baguio town-site reservation have also been carried on under instructions from the consulting architect. During the year approximately 19 kilometers of proposed roads have been located, of which about 15 kilometers have been subdivided into residence lots. Investigations, surveys, reports, and estimates have been made on proposed artificial lake, water-supply system for the residence of the Governor-General, water-supply system for government buildings, athletic field, temporary native town-site, excavation for proposed civil hospital, excavation for proposed municipal market, constabulary school-building site, and the government agricultural and stock-farm buildings.

A location was made upon the request of the governor of Benguet, with a view of connecting the new and old portions of the Benguet road near Laoacan, Benguet, in the endeavor to utilize the stretch of 6.4 kilometers of well-constructed old Benguet road, between Laoacan and Baguio. This proposed road or trail has a maximum grade of 5 per cent. The relocation and survey of the Baguio-Suyoc trail, 11.27 kilometers in length, and a relocation of a 1.6-kilometer section of the Baguio-San Fernando trail, was also completed. A survey along the Agno ridge about 29 kilometers north of Baguio, locating a trail about 16 kilometers in length and having a maximum grade of 6 per cent, was completed. This trail forms an important part of the route between Baguio and Cervantes.

During the year approximately 9,470 meters of roads have been opened up for traffic. The general policy followed in the construction of roads from the town-site funds has been to build those roads which were most important in providing communication through certain residential sections in which lots had been sold and the construction of residences is pending or in progress, and in decreasing the distance to parts of the reservation to which there was considerable traffic. The most of these roads are suitable only for the dry-season traffic. They will require additional expenditures for surfacing and for the construction of permanent bridges and culverts.

During the coming year it is contemplated surfacing approximately 6 kilometers of road between those points carrying the heaviest traffic, and rendering accessible all parts of the town site throughout the year. The estimated cost of the proposed surfacing, using local stone, is approximately ₱2,500 per kilometer for a surfaced section 3.65 meters wide.

Inspection of the construction of the residence for the Governor-General has also been carried on by this office, very little progress being made on this work up to the latter part of June, owing to inability to find suitable sand and lime. This difficulty has been overcome, and construction work was progressing satisfactorily at the close of the year.

Funds accruing from the sale of reservation lots are in general available for executing the improvements above enumerated, and ₱24,803.28 were expended on construction of roads during the fiscal year and on improvements of the town site.

DIVISION OF BUILDING CONSTRUCTION AND REPAIR.

The position of master builder was vacant from February 12, 1906, to January 11, 1907, on which date it was filled by the appointment of Mr. Walter S. Haldeman.

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A considerable number of the government buildings are of the Spanish type of architecture, two stories in height, the lower stories of which are constructed of massive but inferior masonry, and the upper stories of high grades of native timber. Heavy tiling set in motar is the usual type of roofing, although many galvanized-iron roofs have been constructed.

General repairs have been required, usually on account of the destructive effects of the white ants (anay), which ultimately attack the best grades of timber, and on account of the weathering of the masonry, the decay of timber especially at points of contact with masonry, and the deterioration of the roofing. The policy of this division has been to replace flooring whenever practicable with reenforced concrete or steel-concrete construction in order to ultimately attain to a fireproof or a slow-combustion structure. Galvanized iron has been used for the extensive repair of failing roofs. Considerable difficulty has been encountered in securing in the local markets a sufficient quantity of high-grade galvanizing. It is also desired to introduce the use of wire glass and metal sashes for skylights and similar work. The difficulties encountered in roof repairs demand the best of workmanship and material, especially on account of the coexistence of high winds and tropical rains.

The principal buildings extensively repaired during the past year were the intendencio, the ayuntamiento, the internal-revenue building, the Malacañan palace, the Santa Lucia barracks, painting of the roofs of the government laboratory building, the conversion of some of the city shops into buildings suitable for the school of trades and arts, of the old captain of the ports building into a union ticket office, of the old port works building located on the north side of the Pasig River into a Chinese detention station, and of the Santa Lucia building formerly occupied by the bureau of port works into a building suitable for temporary use by the medical school.

Sixty-nine projects have been executed under maintenance, alteration, and repairs, provided for in the appropriation bill and authorized by the Governor-General, at a cost of ₱30,979.25.

Two hundred and two projects under miscellaneous repairs have been accomplished for the various governmental bureaus and offices under proper authorization and for which bills are rendered in accordance with accounting regulations approved by the auditor, at a cost of ₱36,767.97.

There have been executed 527 general repairs and emergency projects at a cost of ₱25,464.03.

A total of 798 projects have been executed at a cost of ₱93,211.25.

The following 9 buildings have been completed by contract, inspections furnished by this office:

Building.	Contractor.	Contract price.
Insane ward, San Lazaro	The B. W. Cadwallader Co	₱32,044.00
High school, Dumaguete	R. M. Gotauco	26,350.00
High school and shop, Tagbilaran	do	28,000.00
High school, Surigao	do	27,000.00
Trade school, Surigao	do	9,400.00
Provincial building, Calapan	Paulsen, Foote & Silver	13,433.00
High school, Iloilo	R. M. Gotauco	28,850.00
Intermediate school, Iloilo	W. M. Lambert	14,459.86
Trade school, Iloilo	R. M. Gotauco	13,600.00
Total		193,136.86

The following 8 buildings have been started and are in course of construction:

Building.	Contractor.	Contract price.
Intermediate school, Ilagan	M. S. José	₱13,987.99
High school, Bacólod	R. M. Gotauco	30,850.00
Trade school, Bacólod	W. H. Lambert	15,991.17
Governor-General's residence, Baguio	O. F. Campbell	26,885.00
Trade school, Bacolor	Antonio Santos	12,000.00
High school, San Fernando, Pampanga	Tan Samco	44,606.60
Provincial building, San Fernando, Pampanga	J. W. Gray	69,787.00
Constabulary barracks, Zamboanga	W. N. Clum	42,500.00
Total		256,607.76

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Bids have been received and are under advisement for the construction of the following buildings:

Building.	Lowest bidder.	Bid.
High school, Capiz	W. H. Lambert	₱39,000.00
Provincial building, Albay	B. W. Cadwallader Co	73,000.00
Constabulary barracks, Albay	do	51,925.00
High school, Iba	R. M. Gotauco	26,800.00
Trade school, Catbalogan	R. E. Scott	21,000.00
High school, Oranl	Tan Samco	12,486.00
Total		224,211.00

PROVINCIAL WORK.

The tabulation of work accomplished by the district engineers shows a total of 58.5 kilometers of road construction, 327.7 kilometers repaired, and 1,055.7 kilometers maintained. Of bridges and culverts of all classes 378 were constructed and 176 repaired; 11 buildings were constructed and 20 repaired.[a] Twenty-six surveys were made at a cost of ₱14,444.76 and miscellaneous work executed at a cost of ₱66,420.97. The total expenditures under the district engineers aggregated ₱993,093.20, an increase of ₱138,000 over the preceding fiscal year. The total cost of superintendence of these expenditures was ₱83,438.09, of which bills to the amount of ₱31,071.25 were rendered in accordance with the provisions of act No. 1401. With few exceptions the culverts and bridges were constructed of permanent materials, such as masonry, reenforced concrete, steel-concrete, or steel. The largest reenforced concrete arches constructed have a span of 18.3 meters.

A brief resume of important works in each district follows:

District No. I.—Comprising the provinces of Cagayan and Isabela, Mr. R. A. Blair, district engineer up to April 1, 1907, Mr. Alex. Mackenzie, acting district engineer from April 1 to June 30, 1907. Five bridges are under construction between Tuguegarao and Cabagan, 3 bridges have been constructed, and various smaller road and bridge projects executed. The provincial government building is under construction, and a temporary trade school has been constructed at Tuguegarao. Repairs have been made to the constabulary building and to the provincial high school building at Ilagan. Plans have been prepared for the municipal market at Tuguegarao and for the municipal building at Amulung. Three surveys and an investigation on the Aparri River have been completed. The total expenditures under the supervision of the district engineer were ₱35,876.17.

District No. II.—Comprising the Provinces of Ilocos Norte, Ilocos Sur and La Union (transferred temporarily from District III), Mr. E. P. Shuman, district engineer. In Ilocos Norte 7 bridges have been constructed and 18 repaired. The provincial building has been repaired and several plans, reports, and surveys made. Under municipal work 16 buildings have been repaired or constructed. In Ilocos Sur 14 bridges have been constructed, 9 provincial buildings repaired or reconstructed, 27 bridges repaired, and 15.868 kilometers of road reconstructed or repaired. Under municipal work, 17 buildings were constructed or repaired; of these the provincial trade school at Vigan is being constructed of concrete. Considerable interest is being shown in Ilocos Sur in the extension of existing irrigation projects. Insular aid for these projects does not appear expedient, and it is not feasible to finance them under existing laws. The total expenditures under the supervision of the district engineer were ₱106,070.97.

District No. III.—Comprising the provinces of Pangasinan and La Union (temporarily transferred to District II), Mr. E. S. Wheeler, district engineer. A second story of the Binalonan presidencia was constructed. California redwood was used, except for the flooring, which was lambang. The Dagupan-Binalonan road repairs consisted of the construction of 42 reenforced concrete box culverts of spans varying from 1.2 meters to 3.65 meters, and one 8.5 meters reenforced beam bridge, 0.71 meters deep. The total aggregate spans of these bridges and culverts was 89 meters. No work was executed on the roadway except the construction of approaches to the above structures. On the Bayam-

[a] These tables have been omitted and filed in the Bureau of Insular Affairs, War Department.

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bang-Oaoa road two reenforced culverts were completed. The Dagupan-Mangaldan road was reconstructed into a macadam road for the first 0.8 kilometer and 1 steel I-beam bridge, span 9.144 meters was constructed on old Spanish abutments. Between San Jacinto and Manaoag, two 18.29 meter reenforced arches were constructed, and one 5.48 meter reenforced concrete arch culvert on the road from Manaoag to Binalonan, at the barrio of Coldona. One 9.144 meter I-beam bridge has been completed in the barrio of Suspiro, between Dagupan and Binmaley. One 12.2 meters reenforced beam bridge, 1.45 meters deep, has been constructed in Dagupan. The total expenditures under the supervision of the district engineer were ₱93,698.81.

District No. IV.—Comprising the provinces of Pampanga and Tarlac, Mr. S. V. Cortelyou, district engineer. In Pampanga 24 bridges of concrete, steel, or reenforced concrete have been constructed, and 2 bridges have been erected. Two important roads providing outlets to water transportation for fertile agricultural districts have been completed. Construction of short stretches of road, macadamizing of the roads on the provincial grounds, and minor road repairs throughout the province have been executed. A provincial stone quarry and rock crushing plant have been opened at Arayat. The preliminary location surveys were made of the sites on which the provincial building and the high school building at San Fernando are to be erected. In Tarlac the principle projects have been the construction of the Tarlac dike, which is treated of separately in this report. Aside from this the work has consisted of maintenance and repair to roads and bridges. The total expenditures under the supervision of the district engineer were ₱81,635.42.

District No. V.—Comprising the provinces of Bulacan and Nueva Ecija, Mr. R. C. Hardman, district engineer up to March 4, 1907. Mr. F. S. Chapman, district engineer from March 5, 1907, to June 30, 1907. In Bulacan 2 reenforced concrete bridges and 29 concrete culverts have been constructed. Two trestle bridges of 24.384 and 39.015 meter spans, respectively, are under erection. Extensive road repairs have been executed throughout the province, mainly by voluntary labor. In Nueva Ecija 2 reenforced concrete bridges have been constructed and 2 are under construction. Heavy road repairs to the extent of 1.6 kilometers have been made and other minor projects executed. All construction in this district has been of a permanent nature. The total expenditures under the superivision of the district engineer were ₱55,031.58.

District No. VI.—Comprising the provinces of Cavite, Laguna, Rizal, and Batangas (temporarily transferred from District VII), Mr. E. J. Westerhouse, district engineer. Throughout the entire district 119 reenforced concrete box culverts, with a total span of 138.38 meters, have been contructed. One 7-panel steel highway bridge and one combination concrete-steel and reenforced concrete bridge, having a total length of 27.5 meters, have been erected. Sixteen bridges have been repaired by putting in steel stringers or new foundations. Good macadam roads, 1.6 kilometers in length, were constructed from provincial funds, 94 kilometers of road were repaired in such a substantial manner as to admit of carromata traffic throughout the wet season, and 156.9 kilometers of improved roads in the district have been maintained either by contract or by the "caminero system." A market building at Pasig, Rizal, having concrete pillars, corrugated galvanized-iron roof, and cement floor was completed out of municipal funds, and the provincial jail at Santa Cruz, Laguna, was extensively repaired, modern sanitary methods sufficient to accommodate 500 prisoners and new sentry walks being provided. Additional fencing was erected and the grounds placed in an attractive condition. The Batangas provincial building, the Rizal industrial school building, the Rizal jail of concrete blocks, 1 warehouse in Laguna, and various repairs to other buildings, all of a substantial nature, have been completed during the year. The irrigation projects in this district, provided for from insular funds, will be treated separately in this report. The total expenditures under the supervision of the district engineer were ₱192,497.61.

District No. VII.—Comprising the provinces of Tayabas and Batangas (temporarily transferred to District VI), Mr. J. S. Nichol, district engineer. The Lucban-Banban trail, 32.186 kilometers in length and impassable, was repaired to such an extent that an American horse can traverse it the entire length. The road to the provincial corral, 0.402 kilometer in length, was completed. One 8.534-meter reenforced-beam bridge has been completed over the stream at Banban, and 1 6.096-meter reenforced-beam bridge at Bantauayan Creek has been designed and is authorized. Street improvements in the municipality of Lucena, consisting of ditching, grading, and surfacing for 0.483 kilometer

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and the construction of 2 concrete culverts, have been completed, and in addition 79.226 kilometers of road have been repaired and maintained, including the replacing of bridges and culverts of a temporary nature with structures of an approved type. The district engineer has had charge of the Pagbilao-Atimonan road and the Sariaya and Candelaria bridges, insular projects which have been heretofore described. The total expenditures under the supervision of the district engineer were ₱86,848.90.

District No. VIII.—Comprising the provinces of Ambos Camarines, Albay, and Sorsogon, Mr. H. C. Humphrey, district engineer. Approximately 209 kilometers of road have been repaired and maintained. Fifty-two bridges have been repaired and 2 have been constructed. Repairs to buildings, minor surveys, examinations, and reports have been executed. The district engineer has not had charge of the high school, constructed at Sorsogon at a cost of ₱16,560.47. In Albay Province the caminero system of road maintenance is in general use and in satisfactory condition. Ambos Camarines has expressed its intention of adopting the caminero system and has appropriated ₱40,000 toward highway repairs. The total expenditures under the supervision of the district engineer were ₱59,611.49.

District No. IX.—Comprising the provinces of Samar and Leyte, Mr. E. O. Worrick, district engineer. The principal work done has been the construction of the constabulary barracks at Catbalogan and the supervision of the construction of the Wright-Taft road, an insular project which has been heretofore described. Several smaller projects and investigations have been completed, including an estimate for the Dagamo-Burauen-La Paz trail and bridges. Contracts have been entered into for a bridge consisting of 3 steel trusses having spans of 18.3 meters each, and bridging the Palo River. The total expenditures under the supervision of the district engineer were ₱50,765.25.

District No. X.—Comprising the provinces of Iloilo, Negros Occidental, Antique, and Capiz, Mr. O. D. Filley, district engineer up to March 13, on which date he was relieved by Mr. R. F. Moss, district engineer. At Bacolod a reenforced concrete arch, 18.3 meters span and having a total length of 36.6 meters, was completed in April and christened the General Smith Bridge. Reenforced concrete arches have been constructed in Negros at Pahamacoy, Cabalagnan, Guinalaran, Cabog, and Silay, and a flat-slab bridge, 6.7 meters span, at Banago. Reenforced concrete pipe culverts have been placed on the coast road from Bago to Silay. In Iloilo 6 reenforced concrete arches have been constructed on the Iloilo-San Joaquin coast road, one flat arch at Baluyan and a combination ipil-steel trestle, 25.908 meters in length, center span 15.24 meters, has been erected at Pototan. Eight other reenforced concrete bridges are under contract and plans have been prepared for 11 more. Many pipe culverts have been placed in the main highways. Repairs have been accomplished on the Mandurriao-San Miguel road, New Washington-Calivo road in Capiz, and upon the Bacolod-Silay, Bacolod-Bago, Bacolod-Murchia, and Silay-Saravia roads in Negros, heavy gravel being obtained from adjacent rivers. Of roads 34 kilometers have been repaired and 5.6 kilometers reconstructed. The municipalities have responded to the suggestions of the district engineers in commendable manner, San Carlos alone voting ₱6,000 for public works. At Bacolod the high school and trade school buildings have been constructed and concrete reconstruction of the provincial jail has been completed. A double-wall fireproof vault adjoining the provincial building was erected for the office of the provincial treasurer, and an addition to the Iloilo trade school is now under construction. The Iloilo "burnt district," one-half mile square, has been resurveyed by the district engineer. A new system of streets has been laid out, and the grading and paving of the new streets is in progress. The total expenditures under the supervision of the district engineer were ₱140,043.73.

District No. XI.—Comprising the provinces of Cebu, Negros Oriental, Bohol (Surigao and Misamis temporarily transferred from District XII), Mr. T. W. Allen, district engineer. The district engineer has supervision of the Cebu-Toledo road, an insular project previously described, and the maintenance of the Cebu-Minglanilla road. Plans have been prepared for a reenforced concrete bridge of three 12.2-meter spans at Dalaguette and for a number of Tribunales and municipal schools. Work in the "burnt area" of Cebu, involving the laying out of modern streets, arranging with the property owners for the transfer and allotment of lots, and the survey of lots has occupied considerable attention. This work when completed will result in an improvement of marked benefit to the city. The total expenditures under the supervision of the district engineer were ₱79,970.28.

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District No. XII.—Comprising the provinces of Surigao and Misamis, was temporarily discontinued as a district March, 1907, and combined with District XI. Mr. B. H. Burrell, district engineer, was then transferred to the bureau of navigation. One bridge was completed over the Surigao River, and a pile driver and 2 ferry pontoons were constructed. Of coral road 1,219 meters were constructed in Surigao. Surveys have been made for a road map of northern Surigao for trails leading into the municipality of Surigao and for the Bogo-Tabagalaon road. Surveys were also made of the Surigao high school grounds, and plans prepared for the Dapa tribunal, which was erected by the municipality. Other surveys were made of provincial property and estimates prepared for the Dinagat school building. The erection of the Surigao high school and shops was given superintendence and plans prepared for various proposed bridges. The total expenditures under the supervision of the district engineer were ₱16,042.99. Additional to the work accomplished under the immediate supervision of the district engineer, the provincial treasurers have expended ₱187,283.20 on public works, of which ₱40,054.02 were expended on the construction, repair, and maintenance of roads, ₱24,964.94 on the construction and repair of bridges and culverts, ₱80,310.61 on the construction and repair of buildings, ₱24,077.09 for equipments, and ₱16,614.06 for miscellaneous expenses.[a] These amounts include the expenditures in the non-Christian provinces which are not subject to the provisions of act No. 1401. The treasurers have in some cases supervised work that properly came under the jurisdiction of the district engineer, in order to save the province the possible expenditure of 10 per cent for superintendence. They have with few exceptions prosecuted the work after consultation with the district engineers and in accordance with the plans and specifications, regardless of the provisions of the law which grant to them the power to execute all work costing less than ₱500. The district engineers have no jurisdiction over municipal works, except upon the request of the municipal councils. While in the past the municipalities have accomplished a minimum amount of public work, the needs of the municipalities have been pointed out by the district engineers and discussed repeatedly with the interested officials, who are now showing considerable activity in needed improvements, especially along the line of bridges, buildings, improved streets, and pure water supplies. No data is available at the presnt time on which a comprehensive tabulation of municipal works for the calendar year 1906 can be based.

IRRIGATION.

Considerable data on irrigation has been presented in previous reports. This subject, so important to the agricultural interests and to the development of the islands, has received slight attention during the past year. No legislation relative thereto has been enacted. No technical forces have been available for topographical surveys and for the collection of data relative to watersheds, stream measurements, precipitation, duty of water, and local laws and customs, all of which are so necessary in the creation of irrigation districts and the establishment of a comprehensive, effective irrigation system for these islands.

It is believed under present conditions to be desirable and practicable to attain to an irrigation institution for the islands which will secure government control of all water, and which will include supervision of all works of construction, except distributing ditches and of the allotment of water within each district. The expenses to be incurred should be secured preferably by the sale of bonds and refundable by the property interests served within a reasonable period. Such refunds should be available upon receipt for new projects, and the maintenance of works constructed should be provided for by some system of taxation against the land served and accomplished under government regulations.

Repairs under the direction of the district engineers have been executed upon the request of the director of lands on the irrigation works of the "Friar lands" purchased by the government and located in the provinces of Cavite, Laguna, and Bulacan. Insular funds to the amount of ₱25,000 were appropriated for these works, ₱20,274.96 of which were expended under the direction of Mr. E. J. Westerhouse, district engineer. The work accomplished consisted of the following:

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[a] A table showing the expenditures by provincial treasurers has been omitted and filed in the Bureau of Insular Affairs, War Department.

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In some of the tunnels the original adobe stone lining failed and the unlined crowns collapsed and restricted wholly or in part the flow of water. Several thousand cubic meters of this caved-in material were removed and the failing sections repaired with arched concrete linings in the Bancud, Balayangan, and Molino tunnels. The Balayangan Dam was repaired with a layer of concrete averaging 0.2 meters in thickness, 5.5 in width, and 33 in length. Light repairs to the Molino Dam were made, and a concrete retaining wall 29 meters in length was extended out from the end of the wing of the Julian Dam to prevent overflow and destructive erosion by flood water.

The San Juan Dam is located in a gorge of adobe stone. A wide, deep channel had been cut by overflowing water at the toe of the dam, undermining the masonry. This was repaired by the construction of a concave reenforced concrete slab, supported by reenforced concrete beams and protected at the toe by a 0.3 meter concrete wall, extending to the ledge rock.

The Marcelo Dam is similarly located, and it was originally constructed over a pocket of about 100 cubic meters of stone, which was covered with rubble masonry laid in lime mortar. The mortar disintegrated and the filling gradually scoured out to within 2 meters of the face of the dam. A concave reenforced concrete slab was constructed spanning the entire opening, supported by a reenforced concrete beam and at the toes of the dam by a concrete wall.

The repairs to the Marilao Dam, Lolomboy estate, province of Bulacan, cost ₱1,239.23, which were expended under the immediate supervision of Mr. F. S. Chapman, district engineer. The work accomplished consisted of putting in new concrete footings under 15 meters of the toe of the adobe stone dam, making similar repairs to 15 meters of wing wall and relaying a portion of the same, the reconstruction of 23 meters of embankment and wall which had fallen, and the pointing up of the face of the dam. General repairs were also made to the retaining wall at entrance of tunnel, to the tunnel, and to 53 meters of the viaduct.

The total amount expended by this bureau in the repair of irrigation works on Friar land estates was ₱21,514.19, for which bills were rendered to the bureau of lands. Surveys, investigations, and estimates have been made on 22 projects, involving proposed repairs to dams, tunnels, retaining walls, and buildings on 7 Friar land estates in the provinces of Laguna, Cavite, and Bulacan, the estimated cost of which is ₱59,500, which should be available at an early date.

The municipal council of Tanauan, Batangas, requested that an investigation survey and estimate be made as to the feasibility of installing a system of irrigation in the neighborhood of Tanauan. The source of water was the San Juan River. As this was a private enterprise, it was undesirable for the government to detail engineers to make plans, surveys, and estimates when such work could probably be done by engineers in private practice. However, it was recommended that the use of water from the San Juan River for irrigation purposes be granted, provided it did not interfere with prior rights.

Señor José Acosta, a resident of San Nicolas, Ilocos Norte, requested authority to restore an irrigation dam and ditch which was built by him in 1887 in order that he might use the waters of the Pamacutan River for irrigation purposes. It was recommended that the request be granted, but that the grant become revocable whenever an irrigation project of larger public benefit be inaugurated. The secretary of commerce and police authorized an inspection of the irrigation project at Ambalangan-Dalin under date of July 13, 1906, to be paid from insular funds. Mr. E. S. Wheeler, district engineer, was authorized to make the investigation and reported that a dam 366 meters long had been constructed with voluntary labor by the town of Asingan for the purpose of diverting the Agno River waters and which has been repaired in a temporary way for a number of years. The principal difficulty of the present dam lies in the formation of sand and gravel bars at the mouth of the intake necessitating their removal periodically. Owing to the character of the river bed at this point permanent works that would obviate this necessity would be expensive and justified only in case of a general demand for water for dry season crops. If the Agno River were properly controlled at this point it is estimated that an area of four to six thousand hectares could be placed under irrigation. Final action on this project is delayed pending special irrigation legislation.

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Señor José M. Larma, a resident of the municipality of Balanga, Bataan Province, in his own name and on behalf of 4 other residents of the same municipality, forwarded a petition to the Philippine Commission that action be taken on their request to reconstruct an irrigating ditch then in disuse on account of lack of maintenance and repairs. A brief inspection of this project showed that the reconstruction of this irrigation system would result in an irrigable area of approximately 240 hectares, and in case construction was accomplished under the plan presented by the petitioners, the estimated cost would be ₱13.75 per hectare. The proposed plan was to rebuild the ditch and canal by the voluntary subscriptions of 20 farmers. These farmers were to constitute a board to manage the ditch and canal for the best interests of the community. In return for their services and subscription they were to be allowed free water for the irrigation of their fields. Those who failed to contribute their share would be compelled to pay an annual rental of two or three cavans of rice per hectare. It was proposed that regulations be prepared by the managers regarding the payment of quotas or rents, subject to the approval of the provincial board of Bataan, which should be observed by all landowners wishing to use the waters of the canal. Final action on this project is pending.

Under date of June 7, 1907, the Governor-General requested an examination for the purpose of determining what measures should be taken to prevent threatened destruction of an important irrigating ditch in the vicinity of Bayombong, Nueva Vizcaya, by the encroachment of the Magat River and estimates of the cost thereof. This canal, commonly called the San Vincente Canal, was constructed about sixty years ago by Padre Juan Villaverde. Its intake is on the Magat River about 8 kilometers above Bayombong. It is about 9 meters wide and 24 kilometers long. It serves an area of about 6,500 hectares containing a population of 1,500. The investigation as carried out showed that at a point about 1 kilometer south of Bayombong the Magat River had widened its flood plain and eroded its northerly bank until it had encroached upon the canal, washed away its bank for some 60 meters, and threatened complete destruction to approximately 240 meters more. It was recommended that a permanent dike or bulkhead 420 meters long be constructed across the eroded opening and parallel to the natural channel of low water of the river, and also 7 short jetties aggregating a total length of 300 meters. The jetties when constructed will interfere with the destructive energy of the swift-flood currents along the line of the canal. The estimated cost of this project was ₱11,775, and, in view of its importance to the agriculturists of Bayombong, government aid is practically assured under proper regulations. Various minor irrigation projects have been investigated and reports thereon submitted.

TARLAC RIVER CONTROL.

The destructive results of the Tarlac River floods upon adjacent fertile lands and upon the railroad embankment, and its serious effect upon the flood stages of the Pampanga River system, has been described in previous reports. As a result of the survey of 1905 the proposed work was divided into 4 sections, the accomplishment of any one of which would aid in the protection of adjacent property from damaging inundations during floods. The most urgent need for the control of the river was along the first section, from and through the municipality of Tarlac to the junction of the Tarlac-Victoria road with the railroad grade.

This section of the project consisted of four divisions: (*a*) A dike along the main road in the municipality of Tarlac from the old government building to the intersection of the road to the Tarlac railroad station with the Tarlac-Victoria road—a length of about 1,800 meters. (*b*) The closing of the Cut-cut River by a reenforced concrete culvert 8.5 meters long and a dam, provisions being made for the passage of water for irrigating purposes through the dam by means of a steel gate, dimensions, 0.9 meters by 1.2 meters. (*c*) The construction of pile jetties into the river for a distance of 123 meters, diverting the destructive flood current from the dike. (*d*) Where the floods had worn deep channels across the road the new dike was to be protected from scour by driving rows of piling at the toe of the dike.

Work was started on the project May 8, 1906, under the supervision of Mr. J. C. Koch, assistant engineer, and at the beginning of the fiscal year 1907 there had been completed 117 meters of jetty consisting of 2 rows of piles with a brush and stone fill; the Cut-cut Culvert and Dam with gate and tunnel was under headway, and the work of closing the gaps in the roadbed was in progress.

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Owing to heavy rains and the resulting damage to work in progress all earth work was suspended until the close of the rainy season. There had been expended a total of ₱7,911.37. During the first part of the fiscal year the work was continued under the direction of Mr. Koch. In August Mr. S. C. Phipps, assistant engineer, was designated as acting district engineer, and assumed control of the Tarlac dike in connection with his other duties.

The construction of the concrete work at the Cut-cut River was completed during the latter part of the rainy season, and it accomplished the work for which it was designed—the providing of water for irrigation purposes and the controlling of flood water. The pile jetty, 123 meters in length, extending from the high ground at the site of the old Provincial building above the old channel of the Cut-cut River into the river channel was finished. The jetty has deflected the current to a considerable extent and the channel above the jetty is filling up with sand in a satisfactory manner. Mr. S. V. Cortelyou, district engineer, returned from the United States in the early part of December, 1906, and immediately took over the supervision of the Tarlac River control. Work on the pile dikes, which were located where the river formerly overflowed and washed out channels through the streets of Tarlac, was continued, and 274 meters of the dike are now protected from destructive flood currents.

Work on the earth dike was resumed on February 1, 1907. The dike is 4.5 meters wide on top and has slopes of 2 to 1 and 1½ to 1 on the river and on the back slopes, respectively. The embankment in this section is composed of about 6 parts of clay to 1 of sand. The clay is a fair quality of red clay containing some sand and gravel. The sand was taken from the Tarlac River. The clay was delivered in two ways: First, in dump cars on a tram track, an average haul of 1,100 meters, at an average cost per cubic meter of ₱0.468; second, in carts hauled by a 12-ton traction engine, an average distance of 760 meters, at an average cost per cubic meter of ₱0.543. The second method not only increased the rate of progress, but also rolled the dike thoroughly. A temporary bridge was constructed across the Tarlac River and a track laid across to a large sandbar. Sand was brought in dump cars and delivered and spread along the dike at an average cost of ₱0.369 per cubic meter.

A trench 1.5 meters in width was dug along the toe of the dike sufficiently deep to reach the underlying layer of clay. The trench was then filled with alternate layers of clay and sand of the same proportions as those used in the dike. The original formation in the last 730 meters of the project is a sandy clay covered by a layer of sand from 0.3 to 1.2 meters in thickness. The work of constructing an embankment of this material with 4.5 meters top width and side slopes 1½ to 1 was let by contract to the laborers at a peseta per cubic meter of embankment made. A group of four or five laborers combined and took a section 15 meters long—upon completing this another section was assigned to them. By this method the laborers are able to work during the coolest hours of the day, less supervision is required, and the laborers have an incentive to work harder. This portion of the embankment containing 45,936 cubic meters was completed in eighteen working days at a total cost, including wages of capataces, of ₱0.226 per cubic meter.

On the river slope of this embankment a layer of clay was placed 0.9 meter in thickness, and extending from the top of the dike down to the layer of clay in the bottom of the trench excavated at the toe of the dike. Cogon grass is being planted on both of the side slopes for the purpose of making them more capable of resisting the action of the river current. From February 1 to June 1, 1907, there were loaded, hauled to the dike, unloaded, spread, and rolled 14,143 cubic meters of material, which cost ₱7,274.81, or nearly ₱0.533 per cubic meter. The principal work remaining to be done on the first section consists of placing a durable surfacing of gravel over the embankment already built, the construction of a jetty 21 meters in length, construction of controlling work for an irrigating ditch, and the maintenance of the work accomplished.

The original project contemplated the continuation of this work from Tarlac to Paniqui, a distance of 21.7 kilometers, the estimated cost of which was ₱444,000. The first section has been practically completed. It is important that provision should be made for the continuation of this dike to a point beyond the Albindia River, a recently created river, which carries the flood water of the Tarlac into the watershed of the Pampanga River with destructive results. This section is 4 kilometers in length and its continuation should be along the general lines followed in the construction of the first section. The estimated cost for the continuation of this work to a point beyond the Albindia River is ₱195,000.

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FINANCIAL STATEMENT.

Popular contribution (outstanding ₱1,839)		₱4,799.29
Provincial appropriation		3,000.00
Municipal appropriation		1,000.00
Resolution of the Commission May 1, 1906		16,000.00
		24,799.29
Expended fiscal year 1906		7,911.37
		16,887.92
Resolution of the Commission January 24, 1907		29,000.00
		45,887.92
Expenditures fiscal year 1907:		
Cut-cut Dam	₱2,931.26	
Pile jetty	2,106.67	
Pile dike	3,728.41	
Earth dike	8,646.54	
		20,412.88
Balance available July 1, 1907		25,475.04

ARTESIAN WELLS.

No other expenditures have been made by this bureau which show such high values to the community served. In many localities the death rate has been materially decreased by the use of artesian well water. The supply has in a few places furnished water to inhabitants of adjoining barrios within a radius of 4 or 5 kilometers.

Requests for artesian wells, where this method of securing a water supply is advantageous, have steadily increased, and the demand is far beyond the capacity of the present outfit. The success of a well in one municipality has caused adjacent municipal councils to pass resolutions authorizing a well within the limits of their municipality. Private contractors have been urged to enter this field, but so far without avail, with the exception of one contractor, whose services have been entirely with the army and navy. However, two additional well-drilling plants have been ordered, one of which is now en route from the United States.

Provisions for charging interested municipalities with the cost of successful wells drilled were made by resolution of the Commission under date of July 30, 1906.

Twenty-seven requests are now on file in this office for artesian wells, as follows: Ambos Camarines, 1; Batangas, 2; Bohol, 1; Bulacan, 6; Cebu, 2; Ilocos Sur, 1; Iloilo, 2; La Laguna, 2; Mindoro, 1; Pampanga, 2; Palawan, 1; Pangasinan, 1; Rizal, 1; Surigao, 1; Tarlac, 1; Tayabas, 2.[a]

MISCELLANEOUS PROJECTS.

Malacañan wall.—The old wall along the Pasig River at the rear of the Governor-General's residence was originally constructed of Guadalupe stone laid in lime mortar. It had recently eroded at the water level and at places was badly cracked. The mortar had disintergrated to such an extent that the wall had settled and some courses had been forced several centimeters beyond the face. Its condition was unstable. Investigations were made, and plans and specification were drawn up for the reconstruction of 116 meters of wall north of the boat slip, and after due advertisement the contract was entered into with Mr. J. E. Ainsworth, contractor. The work is now in progress. The remainder of the old wall below the slip is being repaired under administration. Plans are pending for the removal of the old slip and for making changes in that part of the palace which overhangs the river, so that ultimately the whole work, when completed, will conform to the new harbor lines.

Bayabas and Norzagaray rivers.—Upon request of the provincial governor of Bulacan, investigations were made to ascertain the feasibility of removing ob-

[a] A table showing number of wells drilled during the year and cost has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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structions which prevented the safe passage of timber rafts from the upper stretches of these rivers. The obstructions on the Bayabas River had heretofore prevented all rafting; the Norzagaray or Angat River is, on the contrary, one of the important rivers of the islands. In two localities on the Norzagaray River the channel was so tortuous and rapid that only at certain seasons could rafts pass, and casualties were of frequent occurrence. Plans having been approved, the work of blasting the large boulders blocking the stream was commenced in May, and the project is rapidly nearing completion. This improvement will permit the transportation of larger timber rafts and render the valuable forests on the upper watersheds of these streams accessible to the market.

Several smaller projects have been completed among which are the following: A room on the first floor of the Oriente building was prepared for the use of the economic association of the Philippines. A fireproof document vault in the city hall of Manila was constructed for the use of the court of land registration. A stable was erected for the use of the bureau of agriculture at Alabang, Rizal. A survey was made of a boundary line between the subprovince of Amburayan and the provinces of Ilocos Sur and La Union, including the municipality of Taguding in said subprovince. Reconstruction of the Pasay road, province of Rizal, an approximate distance of 1 mile beyond the limits of Manila was accomplished, and an additional 320 meters cleared, ditched, and graded. The Taytay-Antipolo road, Rizal, was repaired with gravel surfacing over the impassable portions thereof. Insular funds were appropriated for this project.

A survey and estimate was completed for the reconstruction of the road between Santa Cruz and the barrio of Buyabud, Marinduque, the estimated cost of which was ₱17,100. Final action on this project is still pending.

Surveys and estimates were completed to determine the feasibility of protecting the municipality of Boac, Marinduque, during the flood stages of the Boac River, by the construction of a diverting dam or dike and a canal. The estimated cost was ₱2,700. Final action on this project is delayed pending acceptance of the same by the municipal authorities.

Numerous minor investigations, estimates, and reports have been submitted, in accordance with instructions from the Philippine Commission, or upon the request of provincial or municipal authorization.

General Office.—A system of cost-keeping with particular reference to the division of building construction and repair was installed in November and is giving satisfactory results. This system is being extended to other divisions of the bureau and it is proposed to expand it sufficiently to permit cost analysis of works actually in progress, in order that resulting advantages may be derived prior to the completion of a project.

The entire system of bureau accounting was changed in January, 1907, under regulations approved of by the auditor, and the greater part of the accounts of the bureau for the first half of the year were rewritten.

All the accounting for the office of the supervising railway expert was performed by this bureau up to the passage of act No. 1591, February 13, 1907.

The record work for all divisions of the bureau is increasing in volume and importance. The increase in the number of papers handled is about 25 per cent over the previous year, while the cost of same has been decreased by about 20 per cent. The Filipino clerks are advancing in typewriting; in the use of the English language and in office system, and their work along these lines is steadily improving. Considerable time has necessarily been spent by the more experienced clerks in instructing new appointees necessitated by the frequent changes occurring in the personnel of the Filipino clerks. Employees who have served two or three years are far more valuable than new appointees, and every effort is being made to retain the experienced men in the service.

The amount of work has materially increased in connection with the handling of property, materials, and supplies. Approximately 3,500 orders for the issuing of material have been made on the two principal storehouses. The property division also performs the functions of a shipping office and the forwarding of supplies and materials to the various district engineers and public works throughout the islands requires the most detailed supervision. This work is being carried on as economically as possible under the existing conditions, and the expenses therefor can be materially reduced when the various storehouses and storage rooms can be consolidated.

An unstable condition still exists in the personnel. Very few men now in the service of the bureau were connected with it prior to 1903.

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The total vacation and accrued leave taken during the year amounted to two thousand seven hundred and seventy-six days.

This leave was equally divided between vacation and accrued leave. The total amount of leave actually taken was equivalent to an average of about twenty-five days per annum for each employee entitled to the advantages of vacation and accrued leave, or to about 40 per cent of the leave earned. About 20 per cent of the allowable vacation leave was taken during the year.

In the employment of technical men the bureau has not been able to secure promptly the forces needed, mainly on account of the small entrance salary offered, while practically equal salaries have prevailed throughout the States, and to the fact that tenure of office and promotions in the Philippine service are problematic.

It is impossible to make a comparison of the efficiency and economy attained through compliance with the regulations of the civil-service bureau, as this bureau has not been operated under any other system. Compliance with its regulations has, however, assisted in the attainment of uniformity of salaries, in securing available information regarding employees, especially irresponsible applicants, and has saved the expense of an employment division within this bureau. The responsibilities and work devolving upon the employees have increased more rapidly than it has been possible to increase the number of employees. The efficiency shown by the employees and the extra hours of service given so constantly throughout all divisions merits the highest praise.

Financial statement, administration appropriations, bureau of public works, fiscal year 1907.

CREDITS.

Appropriation, act No. 1527	₱669,523.00	
Appropriation, act No. 1660	33,400.00	
Transfer from Friar lands fund	25,000.00	
Total		₱727,923.00

DEBITS.

Expenses fiscal year 1907 paid to date		637,562.86
Balance		90,360.14
Outstanding obligations fiscal year 1907	₱50,000.00	
Less refund to Friar lands fund	4,725.04	
		54,725.04
Available for return to general funds		35,635.10

EXPENSES.

General office	₱61,099.92
Building division	132,272.94
Engineering division	20,998.73
Division of building superintendence	44,562.90
Maintenance of storerooms	13,599.79
Drafting division	10,942.28
Division of the Benguet road	[a] 83,119.77
Division of well drilling	16,925.97
Division of supervising railway expert	12,293.27
Division of the consulting architect	22,400.19
Provincial division, including the offices of the district engineers	204,094.00
Maintenance of equipment	3,055.63
Purchase of new equipment	12,197.47
Total	637,562.86
Outstanding obligations	50,000.00
Balance	687,562.86

[a] Includes cost of surveys, plans, and examinations for projected improvements.

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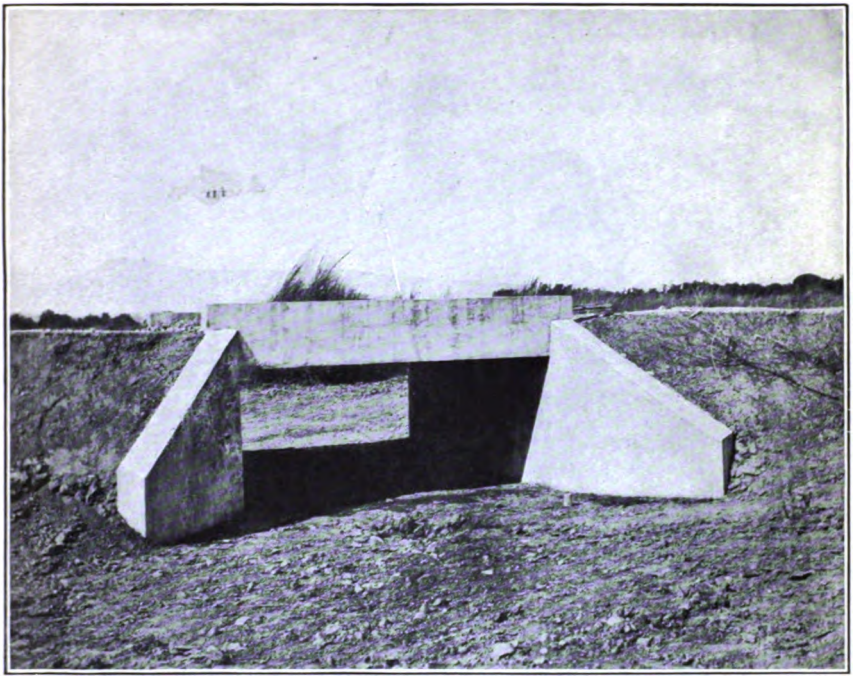
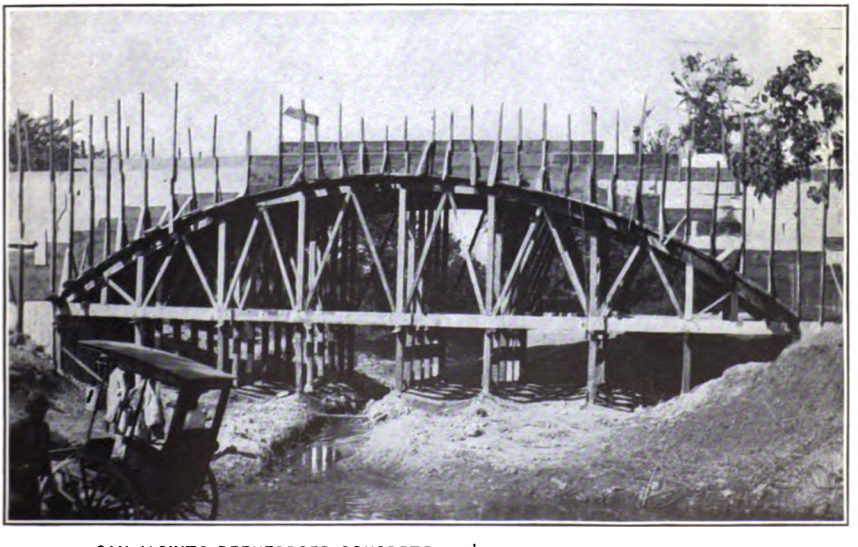


TYPICAL REENFORCED CONCRETE SLAB CULVERT, PANGASINAN.



SAN JACINTO REENFORCED CONCRETE ARCH—60-FOOT SPAN—PANGASINAN.

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TYPE OF SMALL REENFORCED CONCRETE CULVERT, RIZAL.

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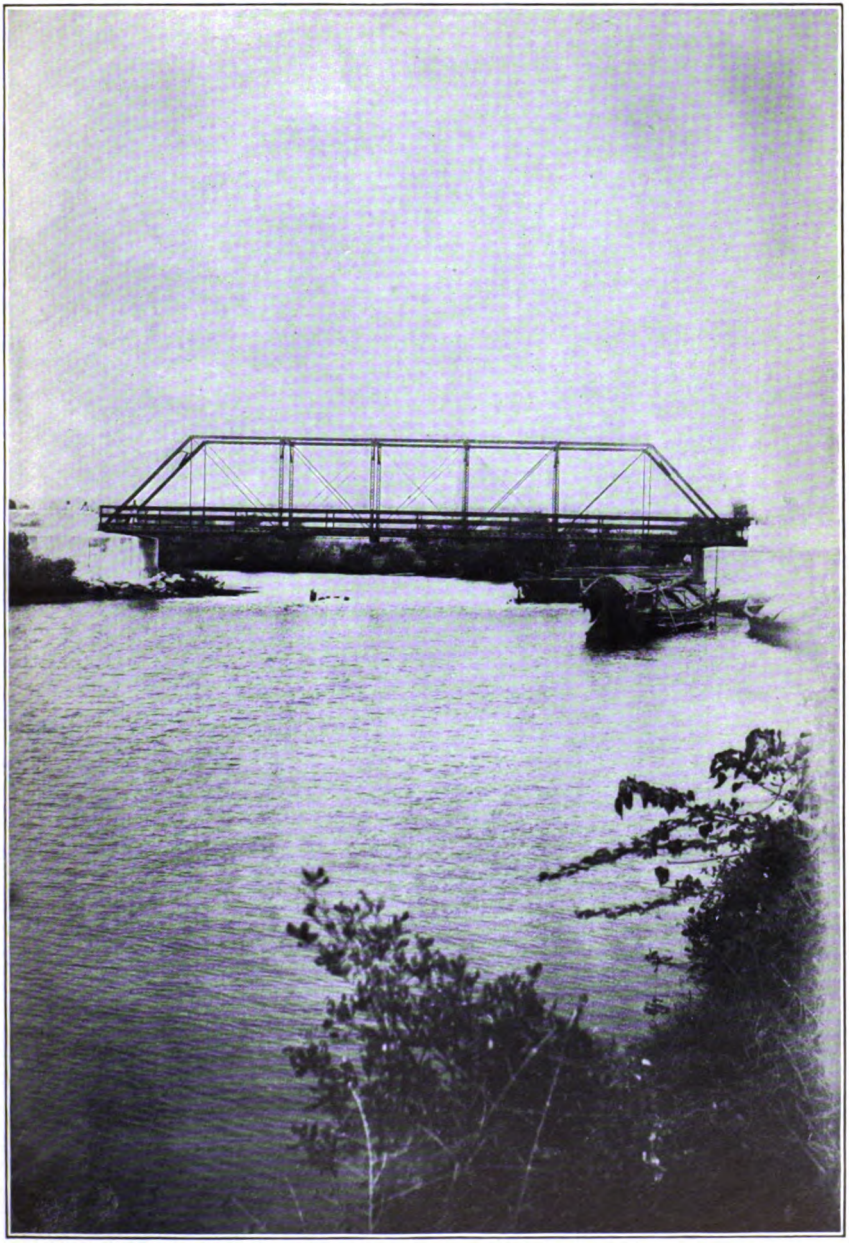

TYPE OF STEEL TRUSS BRIDGE—110-FOOT SPAN—MANALO, CAVITE.

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INCOME.

For services rendered to other bureaus and branches of the government, including superintendence by district engineers, reimbursement for which has been or will be made to this bureau	₱83,449.89
For cost of office of the supervising railway expert to be paid by the Philippine Railway Company, advice of which has not yet been furnished by the auditor	15,160.44
Total	98,610.33

RETURN TO GENERAL FUND.

For services rendered during the fiscal year 1906, which have been paid and turned in	₱18,671.50
Amount of unpaid bills rendered for services as stated above	3,900.79
Total	22,572.29

Respectfully submitted.

J. W. BEARDSLEY,
Director of Public Works.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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APPENDIX D.

REPORT OF THE CONSULTING ARCHITECT.

OFFICE OF THE CONSULTING ARCHITECT,
Manila, P. I., August 23, 1907.

SIR: In accordance with your instructions I have the honor to submit the following report for the fiscal year ended June 30, 1907.

The work below enumerated has been performed and for the purpose of this report is divided into the following classes:

A. Projects for which complete working plans and specifications have been prepared.

B. Projects for which complete plans and specifications are in course of preparation at the present time.

C. Projects for which preliminary plans have been furnished and are now under consideration.

D. Plans for the improvement of the city of Manila.

E. Plans for the improvement of Baguio.

F. Plans for the improvement of other cities and towns.

A.

PROJECTS FOR WHICH COMPLETE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED.

HOSPITAL, BILIBID PRISON.

This project includes, in addition to the hospital building, the inclosing of a tract of land immediately in the rear of the prison of approximately one hectare in area, with a reenforced concrete wall 17 feet high, the thickness thereof at the top being 20 centimeters and at the base 45 centimeters, and the spread of the foundations 2 meters and 43 centimeters. The wall is reenforced with bars placed both vertically and horizontally, resistance to wind pressure being the main consideration in the calculation of the amount of steel and the thickness of wall required.

The hospital building will be entirely of reenforced concrete and will contain two stories—four wards—each with a capacity of 75 beds, and a ward for females with provision for 20 beds. Operating rooms for major and minor surgical cases, isolation rooms, and the usual accessories of a modern hospital are also provided. The roof will be of concrete, practically flat, a portion of which is to be protected from the sun and rain by shelters of light construction. This is intended to give the tuberculosis patients the benefit of treatment in the open air.

This building, with the walls and guardhouses, will be built entirely by prison labor under competent supervision. The amount appropriated by resolution of the Philippine Commission, dated November 10, 1906, was ₱100,000.

INTERMEDIATE SCHOOL, LIPA, BATANGAS PROVINCE.

The plans provide for the remodeling of a large one-story building formerly used as a coffee mill. The changes involved are the division of space into class rooms, laying of new floors, resetting of window frames, and the addition of an arcade. The estimated cost of the improvement is ₱3,000.

INSANE WARD, SAN LAZARO HOSPITAL.

An addition of two stories to the main group of buildings of Spanish construction. It contains on each floor a large ward room with shower baths and water-closets, each ward accommodating 125 patients.

The walls and floors of this building, including the stairs, are of reenforced concrete. The only timber used in the building is that for the window frames and roof trusses.

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This is the first building of reenforced concrete construction to be erected by the Philippine government. The appropriation for this work was ₱55,000.

ASSAY HOUSE, BUREAU OF SCIENCE.

A small building, constructed of native timber, immediately in the rear of the government laboratories. Cost, ₱1,372.50.

ENTRANCE GATE, BILIBID PRISON.

The gateway, with adjoining walls, is constructed of reenforced concrete. The gate is operated by a system of levers and wheels by guards stationed in one of the sentry boxes above the gateway. This work was constructed entirely by prison labor, under careful supervision. The amount allowed for the purchase of materials was ₱1,000.

ANIMAL HOUSES, BUREAU OF SCIENCE.

Buildings constructed of native timber for the purpose of sheltering small animals used for experimental purposes. The estimated cost of these houses is ₱12,000.

GATEHOUSE, RESERVOIR OF NEW WATERWORKS SYSTEM, MANILA.

A building, 8.33 meters by 6.20 meters, situated at the corner of the reservoir, for controlling the water supply. Floor and walls of reenforced concrete. The tile roof is supported on a semicircular vault of reenforced concrete. A design for a parapet wall surrounding the reservoir is included in this project. The cost of the gatehouse is estimated at ₱5,000.

PROVINCIAL GOVERNMENT BUILDING, ALBAY, ALBAY PROVINCE.

The revised plans provide for the construction of a second story on the walls of a building originally constructed by the Spanish Government for a prison. The first story is constructed of heavy stone walls. The plans provide for the second-story walls to be of reenforced concrete. The original building was examined by the consulting architect in December, 1906, and with the exception of the roof, was found to be in excellent condition. The building is 160 meters long and 134 wide and contains two interior courtyards. The lowest bid offered for the construction was ₱65,000.

CONSTABULARY OFFICERS' QUARTERS AND BARRACKS, ALBAY.

The plans provided for the construction of a second story of reenforced concrete on the stone walls of the former "Casa Gobierno" of Spanish construction. The extreme dimensions are, approximately, 24.9 meters by 30.6 meters. This building, like the provincial government building, faces the public plaza of Albay. The lowest bid for the construction was ₱55,784.

HIGH SCHOOL BUILDING, ORANI, BATAAN PROVINCE.

The remodeling of a large building of Spanish construction belonging to the municipality. The lowest bid for the work was ₱12,486.

RESIDENCE FOR THE GOVERNOR-GENERAL, BAGUIO, BENGUET PROVINCE.

This building will form the central portion of the complete design. The first-story walls are of local stone and the second of Benguet pine, the building being so designed that the second-story walls may, at a later date, be replaced with reenforced concrete. A suite of large reception rooms is located on the first floor. Owing to the difficulty of securing materials and labor, a longer time is being taken for construction than was expected. The amount appropriated by the Commission was ₱30,000 and the amount of the lowest bid, not including plumbing, was ₱26,885.

PUBLIC MARKET, BAGUIO, BENGUET PROVINCE.

This building is to be situated in the business section and is to be constructed entirely of Benguet pine, the columns being of specially selected heart pine. The amount of the appropriation was ₱5,000.

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TRADE SCHOOL, MALOLOS, BULACAN PROVINCE.

This is a building of one story with walls of reenforced concrete. A machine room located in the rear of the building will contain a dynamo for the purpose of supplying the public buildings with electric light. The estimated cost is ₱19,000.

TRADE SCHOOL, TUGUEGARAO, CAGAYAN PROVINCE.

A revised design for a one-story building of reenforced concrete walls similar to the building at Malolos. The estimated cost is ₱15,000.

HIGH SCHOOL, CAPIZ, CAPIZ PROVINCE.

This project consists of the remodeling of the provincial prison, constructed by the Spanish Government. The building faces the public plaza and is well located for school purposes. The extreme dimensions of the building, which contains two interior courtyards, is 39 meters by 62 meters. The design provides for the addition of a large assembly hall, to be used for public meetings as well as for school purposes. The lowest bid was ₱39,000.

TRADE SCHOOL, CEBU, CEBU PROVINCE.

A group of one-story buildings, to be constructed of native hard wood, at an estimated cost of ₱20,000.

TRADE SCHOOL, LAOAG, ILOCOS NORTE PROVINCE.

A one-story building, of reenforced concrete, 31 meters by 12 meters. The estimated cost is ₱19,000.

PUBLIC MARKET, PAGSANJAN, LA LAGUNA PROVINCE.

Construction of reenforced concrete for the columns and floors, and native hard wood for the trusses. By reason of its situation on the Pagsanjan River, excellent transportation facilities are provided. The dimensions are 17.5 meters by 57 meters. The estimated cost of this building is ₱14,000.

TRADE SCHOOL, SAN FERNANDO, LA UNION PROVINCE.

A one-story building, 12.04 meters by 36.5 meters, constructed of stone, with an extension in the rear 21 meters long. The estimated cost is ₱14,000.

PROVINCIAL SCHOOL, BONTOC, LEPANTO-BONTOC PROVINCE.

The plans provide for a one-story building, to be constructed of native pine, around three sides of a court. ₱3,000 have been appropriated for this work.

PROVINCIAL PRISON, CALAPAN, MINDORO PROVINCE.

A one-story building, 13 meters by 29.5 meters, to be constructed of native hard wood with concrete floors. The estimated cost of materials is ₱6,250.

TRADE SCHOOL, BACOLOD, OCCIDENTAL NEGROS PROVINCE.

A one-story building, 12 meters by 31 meters, with a forge room adjoining at the rear. Constructed of reenforced concrete at a cost of ₱16,000.

PROVINCIAL SCHOOL, SAN JUAN DE GUIMBA, NUEVA ECIJA PROVINCE.

A two-story building, constructed of native hard wood. The plans provide for 5 class rooms, a principal's office, supply room, and a large assembly hall. The estimated cost is ₱26,000.

PROVINCIAL SCHOOL, BAYOMBONG, NUEVA VIZCAYA PROVINCE.

This building is similar to that at San Juan de Guimba.

BODEGA, IWAHIG, PALAWAN PROVINCE.

A storehouse adjoining the pier, to be constructed of reenforced concrete, for the purpose of containing supplies for the penal settlement. The estimated cost of the materials is ₱1,700.

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HIGH SCHOOL, SAN FERNANDO, PAMPANGA PROVINCE.

The design provides for a building containing 10 class rooms, with large assembly hall on the second floor. The first-story walls are to be of reenforced concrete; the second-story walls and floors of first group native hard wood. The dimensions are 16.28 meters by 38.03 meters. The amount of the lowest bid offered was ₱42,500.

PROVINCIAL GOVERNMENT BUILDING, SAN FERNANDO, PAMPANGA PROVINCE.

The plan provides for construction of reenforced concrete throughout for walls, floors, and stairways. All timber used to be of first group native hard wood. Roof of pressed cement tile. The dimensions are 34.16 meters by 20.26 meters, the amount of the contract being ₱69,787.

INTERMEDIATE SCHOOL, BINALONAN, PANGASINAN PROVINCE.

Two sets of plans have been prepared—one providing for timber construction throughout, the other for first-story walls of brick. The building contains 10 class rooms, with a large assembly hall on the second floor. The dimensions are 42.40 meters by 19.50 meters, the estimated cost being ₱40,000.

PUBLIC MARKET, PASIG, RIZAL PROVINCE.

Construction of reenforced concrete piers and concrete floor. Dimensions, 17.5 meters by 57 meters. Actual cost, approximately, ₱10,000; the location near the river permitting the delivery of materials at a low cost.

PROVINCIAL GOVERNMENT BUILDING, PASIG, RIZAL PROVINCE.

Construction of reenforced concrete throughout walls, floors, and stairways, is provided by these plans. Such timber as is used to be of first group native hard wood, with roof of pressed cement tile. Owing to its being situated on soft ground, heavy piling is necessary. The contract price is ₱97,600.

SCHOOL OF FISHERIES, MALABON, RIZAL PROVINCE.

The plan provides for the construction of a building utilizing existing stone walls of Spanish construction. The plan includes a large room to be used as an aquarium. The lowest bid was ₱16,945.

TRADE SCHOOL, CATBALOGAN, SAMAR PROVINCE.

The dimensions of this one-story building are 31 meters by 12 meters, construction to be of reenforced concrete at an estimated cost of ₱19,000.

MUNICIPAL SCHOOL, DINAGAT, SURIGAO PROVINCE.

This is a one-story building to be constructed of native hard wood. The plan provides for three class rooms and the estimated cost is ₱3,600.

PROVINCIAL GOVERNMENT BUILDING, TARLAC, TARLAC PROVINCE.

This building is to be constructed entirely of reenforced concrete and is to be two stories in height, the dimensions being 29.10 meters by 16.90 meters, and the estimated cost ₱64,000.

PROVINCIAL SCHOOL, IBA, ZAMBALES PROVINCE.

This is a two-story building to be constructed of native hard wood. Five class rooms are provided for, with a large assembly room on the second floor. The amount of the lowest bid was ₱26,800.

DAIRY BARN, ALABANG STOCK FARM, MUNTINGLUPA, RIZAL PROVINCE.

A shelter containing stalls for 48 cows and including a dairy room, to be constructed of concrete and native hard wood at the government stock farm at Alabang. The amount appropriated was ₱6,600.

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B.

PROJECTS FOR WHICH COMPLETE PLANS AND SPECIFICATIONS ARE IN COURSE OF PREPARATION.

PUBLIC SCHOOL, TONDO, MANILA.

A two-story building containing 12 class rooms and a large assembly hall, to be constructed of reenforced concrete. The site adjoins the Tondo Church and includes a large playground. The extreme dimensions are 52.8 meters by 41.2 meters. The amount appropriated is ₱100,000.

MUNICIPAL BUILDING AND SCHOOL, LIBON, ALBAY PROVINCE.

This is a one-story building of native hard wood. The estimated cost is ₱7,300.

MUNICIPAL SCHOOL, SANTO TOMAS, BATANGAS PROVINCE.

This is a building of one story, to be constructed of local stone. Dimensions, 11.1 meters by 24.1 meters. The estimated cost is ₱6,000.

TRADE SCHOOL, BATANGAS, BATANGAS PROVINCE.

A one-story building of native hard wood, measuring in extreme dimensions 9 meters by 32.4 meters. The estimated cost for materials is ₱5,487.

CIVIL SANITARIUM, BAGUIO, BENGUET PROVINCE.

The site reserved for this institution is a pine-covered ridge commanding a fine view of the Bued River canyon and Mount Santo Tomas, and oriented in such a manner that all the wards and private rooms have the benefit of the morning sun. The sanitarium will be protected by higher hills toward the west, the direction from which severe storms usually come. The top of the ridge is to be leveled to furnish a convenient and proper setting for the buildings.

The main building is to be 60 meters in length, the wards being at the ends and the operating and administrative rooms in the central portion. The second floor contains 6 private rooms. The plans provide for construction of Benguet pine, with masonry foundations and chimneys of reenforced concrete. The amount appropriated is ₱50,000.

PRESIDENCIA, QUINGUA, BULACAN PROVINCE.

A two-story building containing the municipal offices. The walls are to be of reenforced concrete, the balance of construction of native hard wood. The dimensions are 10.5 meters by 13.5 meters, and the estimated cost is ₱13,000.

PRESIDENCIA, BALIWAG, BULACAN PROVINCE.

The plans for this building are similar to those adopted for Quingua, with the exception of the dimensions, which are 16.2 meters by 20.2 meters. The estimated cost of this building is ₱27,259.

PROVINCIAL PRISON, CAPIZ, CAPIZ PROVINCE.

This is a one-story building, to be constructed of native hard wood with concrete floors. The dimensions are 13 meters by 29.5 meters, and the estimated cost of the materials is ₱6,250.

HIGH SCHOOL AND TRADE SCHOOL, CAVITE, CAVITE PROVINCE.

Two adjoining buildings constructed under the Spanish Government are to be remodeled. The construction is mostly of stone and brick masonry. The estimated cost of this work is ₱8,000.

HIGH SCHOOL, CEBU, CEBU PROVINCE.

This school building will contain 10 class rooms and a large assembly room in two stories. The walls are to be of reenforced concrete; the floors and other construction of native hard wood. The outside dimensions are 18.5 meters by 41.45 meters, and the cost is estimated to be ₱66,000.

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HIGH SCHOOL, SANTA CRUZ, LA LAGUNA PROVINCE.

This building will contain 10 class rooms and an assembly room on the second floor. The first-story walls will be of reenforced concrete. The second-story walls and the floors are to be of native hard wood of the first group. The estimated cost is ₱43,000.

TRADE SCHOOL, SANTA CRUZ, LA LAGUNA PROVINCE.

A building of one story, to be constructed with reenforced concrete walls. Extreme dimensions are 11.7 meters by 37.2 meters. This school differs from the usual trade school in that it contains a pottery school, the kilns being detached from the main building. Prison labor is to be used in the construction, the cost of the materials being estimated at ₱9,000.

CONSTABULARY BARRACKS, SANTO DOMINGO, LA LAGUNA PROVINCE.

This project consists of repairing the stone walls of a fortified post of Spanish construction and in erecting an upper story of timber upon the existing walls. The cost of the improvement is estimated at ₱18,500.

MUNICIPAL SCHOOL, BAYAMBANG, PANGASINAN PROVINCE.

A two-story building to contain 8 class rooms, to be constructed of native hard wood. The outside dimensions are 14.8 by 23 meters, and the cost is estimated at ₱20,000.

MUNICIPAL SCHOOL, BINALONAN, PANGASINAN PROVINCE.

The revised plans provide for a building 9.25 by 28.25 meters, containing 5 class rooms and an assembly room. The first-story walls are to be of local brick, the balance of construction of native hard wood. The estimated cost is ₱25,000.

MUNICIPAL BUILDING, ALAMINOS, PANGASINAN PROVINCE.

A two-story building to contain the municipal offices, to be constructed of native hard wood and to cost, approximately, ₱5,000.

TRADE SCHOOL, LINGAYEN, PANGASINAN PROVINCE.

A one-story building with reenforced concrete walls, the dimensions being, approximately, 13 by 50 meters. The cost of the materials is to be ₱20,000, the labor being supplied by prisoners.

HIGH SCHOOL, LINGAYEN, PANGASINAN PROVINCE.

This is to be a two-story building, constructed of reenforced concrete. Twelve class rooms are provided, with a large assembly hall. The dimensions are 25 by 47.5 meters. The building will be constructed with prison labor, the estimated cost of materials being ₱80,000.

This building, with the trade school above mentioned, is to form part of the group of provincial school buildings, allowing for the construction of dormitories and other buildings in the future.

MUNICIPAL SCHOOL, PASAY, RIZAL PROVINCE.

A one-story building, to be constructed of native hard wood and providing 5 class rooms, the estimated cost being ₱7,600.

HIGH SCHOOL, MASBATE, SORSOGON PROVINCE.

A two-story building containing 5 class rooms and an assembly room. The first-story walls are to be of reenforced concrete, the balance of native hard wood. The dimensions are 9.25 by 28.25 meters, and the estimated cost is ₱24,000.

MUNICIPAL SCHOOL, BULASAN, SORSOGON PROVINCE.

A building of one story, to be constructed of native hard wood. The plan provides for 4 class rooms and a principal's office. Extreme dimensions, 23 by 14.8 meters. The estimated cost is ₱11,500.

MUNICIPAL SCHOOL, PURA, TARLAC PROVINCE.

A one-story building to be constructed of hard wood, obtained locally, and containing 5 class rooms and an assembly room. Dimensions, 14 by 41 meters. The estimated cost is ₱22,500.

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INTERMEDIATE SCHOOL, CAMILING, TARLAC PROVINCE.

This building is of two stories and provides for 5 class rooms and an assembly room. Construction throughout is to be of native hard wood. The dimensions are 9.25 by 28.25 meters, and the estimated cost is ₱24,000.

PROVINCIAL GOVERNMENT BUILDING, LUCENA, TAYABAS PROVINCE.

The design provides for construction throughout of reenforced concrete for walls, floors, and stairways. All timber used is to be native hard wood. Pressed cement tile will be used for the roof. The estimated cost is ₱85,000.

MUNICIPAL SCHOOL, TAYABAS, TAYABAS PROVINCE.

This project consists of the remodeling of a masonry building of Spanish construction. The cost is, approximately, ₱10,000.

Examination of the above list suggests the duplication of much of the work, especially in the case of school buildings. By the adoption of model types of school buildings, much of the work of drafting plans has been saved. While it seldom happens that the same detailed plans will suit any two cases exactly, it is found that with a few slight modifications the same general plans may be made to meet the conditions. Thus, the plan for a two-story building containing 5 class rooms and an assembly room, originally prepared for Masbate, was made to meet the conditions at Camiling, Tarlac, by changing the reenforced concrete construction of the first-story walls to timber, which is locally available; and again at Binalonan, Pangasinan, by making the first-story walls of brick, the local building material. In both cases the preparation of special plans was necessary, but after the first one had been completed the work of preparing the other two was considerably simplified.

The general plan of the trade schools now being erected has been the same for nearly all cases, but the local conditions necessitated variations in the materials and in some of the minor arrangements.

The public markets at Pasig, Rizal, and at Pagsanjan, La Laguna, were erected under the same local conditions from the same plans.

Unless the conditions are exceptional, each set of plans prepared for a public building becomes a model plan adaptable to other places under similar conditions. For this reason the possession of model plans for public buildings, constantly subject to modifications made in the light of experience, becomes a valuable asset.

Four of the buildings for provincial government offices, those of Pampanga, Rizal, La Laguna, and Tayabas, were designed under substantially the same local conditions. All are to be constructed of reenforced concrete throughout and the same floor plans were adopted in each case. The importance of these buildings seems to justify the additional effort of designing special façades in each instance.

C.

PROJECTS UPON WHICH PRELIMINARY PLANS AND ESTIMATES HAVE BEEN SUBMITTED.

During the year preliminary plans and estimates have been prepared for the following buildings, the construction of which is now under consideration:

Model pottery school, estimated cost, ₱3,500; offices, bureau of navigation, Engineers Island, estimated cost, ₱43,000; warehouses, Pasig River, estimated cost, ₱558,000; general hospital, Manila, estimated cost, ₱780,000; cottages, Baguio, estimated cost, ₱22,000; dining hall, Baguio, estimated cost, ₱8,000; Philippine School of Arts and Trades, estimated cost, ₱25,700; schools, Baguio, estimated cost, ₱12,000; primary school, Tubigon, Bohol, estimated cost, ₱4,000; Presidencia, Bulacan, Bulacan, estimated cost, ₱16,000; prison, Malolos, Bulacan, estimated cost, ₱28,000; garrison, Iwahig, Palawan, estimated cost, ₱9,500; prison, Lingayen, Pangasinan, estimated cost, ₱28,413.

The combined estimated cost of these projects, according to preliminary plans, is ₱1,538,113.

D.

IMPROVEMENT OF THE CITY OF MANILA.

The most important work of the year has been the preparation of plans for the development of the reclaimed area and the Luneta extension, showing the

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street system, railway terminal, docking facilities of the new wholesale commercial section, and the treatment of the Luneta extension as public gardens, with the adjoining areas reserved for semipublic purposes.

The plan of the Luneta extension is the development of the general scheme prepared by Mr. D. H. Burnham for this improvement, the design being definitely determined by the bulkhead which forms the outline of this extension.

During the year arrangements have been made for the sale of the club sites at the southern end. This section, containing 18,790 square meters, is divided into three lots, the one in the center being about twice the size of those at the ends. The plan suggests the arrangement of the buildings to be erected on these sites, placed in such a way as to afford each building the least possible obstruction to air and view. The central and largest lot was acquired by the Army and Navy Club and that adjoining the proposed boulevard by the Elks Club, the lot facing the bay alone remaining to be sold.

The conditions of the sale provide that the general design of the club buildings shall be subject to the approval of the consulting architect, the purpose of this provision being to obtain a general unity in the designs of the buildings facing the public gardens.

The site reserved for a hotel, approximately 164 by 205 meters, is to be sold at auction on July 5, an amendment to act No. 1360 having been made by the Commission, with provisions for the sale of this land at public auction, and allowing an exchange to be made for lands situated in the city of Manila. By this sale of the hotel site the government may acquire nearly all of the property necessary for the development of the Government Center, of which Calle Nozeleda is one of the radiating streets, and at the same time give the prospective hotel company full possession of this desirable location for a hotel, such possession making it possible to sell bonds to much better advantage than would be the case if the site were to be held on lease.

The filling of the Luneta extension by hydraulic dredge is now completed. While it would be possible to begin immediately the driving of piles, it is expected that by the end of the year the surface of the ground will be sufficiently hard to allow building operations to proceed without difficulty.

During the year a plan for grading the city moats was prepared and submitted to the municipal board. The plan provides for a system of surface drainage, this being considered more economical, both in initial cost and in maintenance, than underground drainage and more suited to the conditions. If funds are not at present available for completing this work it is believed important that a beginning, at least, be made on the improvement of the moats by grading and draining, in order to convince the public that the present unsightly and barren waste in the center of the city may be converted into a park of unusual beauty and unique surroundings.

On May 1 a committee of five was appointed by the Governor-General for the purpose of making investigations and preparing plans for the reservation of lands for parks in the city of Manila. The park system will include, in addition to the Luneta extension and the moat surrounding the Intramuros, several large parks in the outskirts of the city and playgrounds located in various sections, according to the probable future needs of the population. A preliminary plan showing the distribution of such parks and playgrounds, according to the principles indicated on the Burnham plan, with estimates of the value of the lands required, is in course of preparation.

E.

BAGUIO IMPROVEMENTS.

At Baguio the most important improvement has been the construction of, approximately, 9½ miles of the system of drives extending from the Baguio town site northward to Trinidad Valley and eastward to Pakdal. This system of drives makes accessible all the sections which have been subdivided into residence lots and sold at public auction, besides making these parts accessible by means of carromatas, victorias, or automobiles. In a few places only have the roads a gradient exceeding 5 per cent.

The recommendation made in the last report regarding the protection of the forests in Baguio and the immediate vicinity by burning a system of lanes was this year put into operation, with good results, at an expenditure of ₱350. A

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few fires occurred, but they were confined to small areas and in no case gained sufficient headway to prove destructive to timber.

The peculiar topographical condition immediately west of Baguio and east of Mirador promises to make possible the creation of probably the only element of natural beauty that Baguio does not possess. This area, bounded by the Baguio town site and Mirador, the Naquillian road, and the limestone cliffs, would now be a beautiful mountain lake were it not for a crevice in these cliffs, through which the waterfall of the surrounding hills and a constantly flowing stream, fed by springs, escapes and continues its course by a subterranean passage. This passage may be closed by means of a few cubic meters of masonry. Whether there are other crevices in these cliffs to permit the escape of water can not be definitely ascertained on account of the steepness and the growth of vegetation. A lake of about four hectares in area can be formed by closing the large crevice. Beyond that point the problem is experimental.

The greatest need of Baguio, now that the roads have been constructed, and which would seem to encourage the construction of private dwellings more than anything else, is an adequate water supply. The most attractive building sites are those on or near the hilltops, where water can not be obtained except by hauling from springs at a much lower level.

Owing to the large area over which Baguio extends, independent systems for the various sections could be obtained at much less expense than one general system. The townsite of Baguio, the military reservation, Sunnyside, and Southside may best be supplied from the big spring near the end of the Benguet road. Brookside and Pakdal may be supplied from springs, although it is possible that there are enough springs on the hills north of Pakdal to supply the last-named section with a gravity system.

F.

IMPROVEMENT OF OTHER CITIES.

In some of the provincial cities the demand for new public buildings of a permanent character has suggested the advantage of grouping such public buildings, proposed for either immediate or future construction, in such a way as to suit the public convenience and contribute to the beauty of the surroundings.

The increase in the authority of the provincial governments has led to the necessity of providing suitable buildings for the transaction of official business and the safe-keeping of public funds and records. During the year, plans for six such buildings, with general designs for civic improvements, have been completed.

Albay, Albay Province.—The general plan adopted includes restoration of the buildings facing the public plaza constructed by the Spanish government in about 1850, providing by this means headquarters for the provincial government, the prison, and the district headquarters and barracks for the constabulary.

San Fernando, Pampanga Province.—A tract of land of 10.9 hectares, near the center of the town and the railroad station, has been acquired for public purposes. On this ground are being constructed the provincial government building and the provincial high school, with sites reserved for the industrial school, prison, and hospital.

Santa Cruz, La Laguna Province.—The conditions here are similar to those at San Fernando, Pampanga.

Pasig, Rizal Province.—The property reserved for public purposes is a tract averaging 50 meters in width and almost one-fourth of a mile in length, extending from the river to the center of Pasig. The provincial government building is being constructed near the banks of the Pasig. At the other end of the tract, the prison is being constructed, with space reserved for a court-house. The area between this and the provincial government building is to be treated as a sunken garden.

Lucena, Tayabas Province.—The conditions here are similar to those at San Fernando, Pampanga.

As a general principle, it may be said that the arrangement of public buildings in a logical, orderly, and convenient composition, and the execution of such buildings and approaches in permanent and durable materials, is the architectural expression of the same order, system, and permanency which should exist in the organization of any government.

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The establishment of such civic centers can not fail to impress the public mind with the strength and stability of the government and should, therefore, be regarded as an educational influence of great value.

The value of the construction represented in the detailed plans and specifications completed, as shown in list A, is in accordance with the following tabulation:

Hospital, Bilibid Prison, amount appropriated	₱100,000.00
Intermediate school, Lipa, estimated cost	3,000.00
Insane ward, San Lazaro Hospital, appropriation	55,000.00
Assay house, bureau of science, actual cost	1,372.50
Entrance gate, Bilibid Prison, cost of material	1,000.00
Animal houses, bureau of science, estimated cost	12,000.00
Gate house, Manila reservoir, estimated cost	5,000.00
Provincial government building, Albay, lowest bid	65,000.00
Constabulary buildings, Albay, lowest bid	55,784.00
High school, Orani, Bataan, lowest bid	12,486.00
Residence for governor-general, Baguio, lowest bid	26,885.00
Public market, Baguio, appropriation	5,000.00
Trade school, Malolos, Bulacan, estimated cost	19,000.00
Trade school, Tuguegarao, Cagayan, estimated cost	15,000.00
High school, Capiz, lowest bid	39,000.00
Trade school, Cebu, estimated cost	20,000.00
Trade school, Laong, Ilocos Norte, estimated cost	19,000.00
Public market, Pagsanjan, Laguna, estimated cost	14,000.00
Trade school, San Fernando, La Union, estimated cost	14,000.00
Provincial school, Bontoc, appropriation	3,000.00
Provincial prison, Calapan, estimated cost material	6,250.00
Trade school, Bacolod, Occidental Negros, actual cost	16,000.00
Provincial school, San Juan, estimated cost	26,000.00
Provincial school, Bayombong, estimated cost	26,000.00
Bodega, Iwahig settlement, estimated cost material	1,700.00
High school, San Fernando, Pampanga, lowest bid	42,500.00
Provincial building, San Fernando, contract sum	69,787.00
Intermediate school, Binalonan, estimated cost	40,000.00
Public market, Pasig, Rizal, actual cost	10,000.00
Provincial building, Pasig, contract price	97,600.00
School of fisheries, Malabon, lowest bid	16,945.00
Trade school, Catbalogan, Samar, estimated cost	19,000.00
Municipal school, Dinagat, estimated cost	3,600.00
Provincial building, Tarlac, estimated cost	64,000.00
Provincial school, Iba, Zambales, lowest bid	26,800.00
Dairy barn, Alabang, Rizal, appropriation	6,600.00
Total value	958,309.50

The following tabulation represents the value of the construction for which plans and specifications are in course of preparation, as shown in list B:

Tondo public school, Manila, appropriation	₱100,000.00
Municipal school, Libon, Albay, estimated cost	7,300.00
Municipal school, Santo Tomas, estimated cost	6,000.00
Trade school, Batangas, estimated cost materials	5,487.00
Civil sanitarium, Baguio, appropriation	50,000.00
Presidencia, Quingua, Bulacan, estimated cost	13,000.00
Presidencia, Baliwag, Bulacan, estimated cost	27,259.00
Provincial prison, Capiz, estimated cost materials	6,250.00
High school, Cavite, estimated cost	8,000.00
High school, Cebu, estimated cost	66,000.00
High school, Santa Cruz, estimated cost	43,000.00
Trade school, Santa Cruz, estimated cost materials	9,000.00
Constabulary barracks, Santo Domingo, estimate	18,500.00
Municipal school, Bayambang, estimated cost	20,000.00
Municipal building, Alaminos, estimated cost	5,000.00
Trade school, Lingayen, estimated cost materials	20,000.00
High school, Lingayen, estimated cost materials	80,000.00
Municipal school, Pasay, estimated cost	7,600.00

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High school, Masbate, estimated cost	₱24,000.00
Municipal school, Bulasan, estimated cost	11,500.00
Municipal school, Pura, estimated cost	22,500.00
Intermediate school, Camiling, estimated cost	24,000.00
Provincial building, Lucena, estimated cost	85,000.00
Municipal school, Tayabas, estimated cost	10,000.00
Total value	669,396.00

The aggregate cost of the projects for which preliminary plans and estimates have been prepared, as given in list C, on page 393, is ₱1,538,113.

The total value of construction in the projects handled by this office during the fiscal year was—

List A	₱598,309.50
List B	669,396.00
List C	1,538,113.00
Total	2,805,818.50

These estimates do not include the cost of the general improvement projects for the city of Manila, Baguio, and other cities.

During the year ended June 30, 1907, the following expenses were charged against this office:

Salaries and wages	₱31,730.20
Office supplies	709.68
Transportation and traveling expenses	1,862.37
Postage and telegrams	97.94
Total	34,400.19

Where plans have been required for advertisement for public bidding, or where the execution of the work was assured, it has been the practice of this office to prepare plans showing the details of construction as completely as possible.

In usual architectural practice the drawings upon which the contract is based are not fully detailed, but show in a general way only the quantities and qualities of materials to be required. It is the opinion of the writer that contractors will furnish a much closer bid if they know exactly what materials and labor will be required, and therefore that the fully detailed drawings should be made before the advertisement for bids rather than after.

In the case of work to be performed outside of Manila completely detailed drawings are considered an absolute necessity, as the inspectors of the bureau of public works in charge of the construction should never be left in doubt as to the exact meaning of the plans and specifications, especially where, in remote sections, serious delays would result if they were obliged to refer to the central office in Manila for instructions.

During the year the increasing volume of work has made it necessary to more than double the drafting force of the office.

The position of assistant architect is being filled temporarily by Mr. George H. Hayward, civil engineer. His services have been given to projects requiring a knowledge of civil engineering, such as improvement plans for the city of Manila, Baguio, and other places.

Respectfully submitted.

W. E. PARSONS,
Consulting Architect.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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APPENDIX E.

REPORT OF THE DIRECTOR OF POSTS.

OFFICE OF THE DIRECTOR OF POSTS,
Manila, P. I., October 15, 1907.

SIR: I have the honor to submit the following as the annual report of the bureau of posts for the fiscal year ended June 30, 1907:

PERSONNEL.

The following statement shows the number of persons employed in the bureau at the close of the year, together with position held, and the nationality of each:

Office or position.	Americans.		Filipinos.		Total.
	Classified service.	Unclassified.	Classified service.	Unclassified.	
Office director of posts	19	7	9	11	46
District inspectors	19				19
Postmasters	20	39	5	440	504
Post-office clerks and employees	41	6	63	88	198
Letter carriers, Manila			17		17
Operators		15		56	71
Linemen	3	38		182	223
Railway post-office and steamboat postal clerks	1	1	4		6
Teamsters and drivers		1		6	7
Mail carriers and contractors		19		233	252
Total	103	126	98	1,016	1,343

The following statement shows the changes in the personnel which occurred during the year:

	Americans.	Filipinos.	Total.
Reinstated	4	5	9
Transferred from other bureaus	16	2	18
Appointed, classified service	6	21	27
Appointed, unclassified service	35	404	439
Temporary and substitute appointments	15	58	73
Transferred to other bureaus	6		6
Resigned, classified service	25	5	30
Resigned, unclassified service	20	224	244
Removals, classified service	5	2	7
Removals, unclassified service	23	124	147
Deaths	1	4	5
Temporary and substitute, discontinued	11	31	42

During the first part of the fiscal year an arrangement was agreed upon with the assistant executive secretary whereby as rapidly as possible the municipal treasurers in the smaller municipalities would be also appointed postmasters. On this account a considerable number of Filipino postmasters tendered their resignations to enable the appointment of the municipal treasurers. This explains the large number of Filipino resignations from and the appointment of so many Filipinos to unclassified positions.

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REVENUES.

The following statement shows the gross revenues for this in comparison with those for the fiscal year ended June 30, 1906:

Item.	Fiscal year 1906.	Fiscal year 1907.	Estimated for 1908.
Stamp sales	₱425,261.50	₱607,208.44	₱631,000
Second-class postage	6,293.32	7,661.84	9,100
Miscellaneous	232.25	1,764.98	1,900
Box rents	16,651.52	17,182.39	18,000
Money-order fees transferred to postal funds	35,790.18	37,774.16	40,000
Total	484,228.77	671,586.81	700,000

The revenues collected on telegrams, amounting to ₱236,720.26, is included in the above statement of stamp sales. Of this amount ₱92,834.40 was collected on telegrams sent from military telegraph offices. Act No. 1527 and the subsequent deficiency appropriation act appropriated ₱80,671.74 for the signal service to be withdrawn from the appropriation for the bureau of posts, with the provision that the difference between the amount used and the amount of revenue collected by the bureau of posts on telegrams sent from military telegraph offices, less ₱5,200 allowed for checking the accounts of such offices, should be deposited in the insular treasury to the credit of miscellaneous receipts instead of to the credit of the bureau of posts. Therefore we must deduct the sum of ₱87,634.40, ₱2.11, funds lost in fire at Mariveles, and ₱31, funds lost in transit from Ilog, Negros Occidental Province, which leaves ₱583,919.30 as the net revenues of the bureau.

It is difficult to compare the revenues of this with the fiscal year 1906, owing to the fact that the law requiring the insular, provincial, and municipal governments to pay postage and telegraph charges did not become effective until January 1, 1906, but by comparing the revenues, including telegraph business, for the six months January to June, 1906, inclusive, amounting to ₱326,817.38, with the same period in 1907, in which they amounted to ₱349,644.08, we find the increase to be 7½ per cent. It is not probable, however, that this rate of increase will continue for the year 1908, as the revenues for the last six months of the fiscal year 1907 were undoubtedly above the normal, since the revenues for the quarter ending December 31, 1906, were at least ₱30,000 below normal.

The increase in second-class postage collected is more than 22 per cent, and in box rents more than 3 per cent. Of the miscellaneous revenues, ₱152.22 consisted of money taken from dead letters which had been held in the dead letter office for more than one year. The balance represents property sold, collections from employees for property lost, and waste paper sold.

The real increase in money-order fees is more than 11 per cent, but as ₱1,700 of such fees for this year were used to pay the loss of that amount of money-order funds shipped from Manila to Masbate in March, 1906, the balance transferred to postal funds is less than 6 per cent greater than the amount transferred during the year 1906.

The revenues of the Manila post-office were ₱292,422.39, or 44 per cent of the whole.

EXPENSES.

The following is a comparative statement of the expenses for the fiscal years 1906 and 1907:

Item.	Fiscal year 1906.	Fiscal year 1907.	Estimated for 1908.
Salaries and wages (excepting railway and steamboat postal clerks, mail drivers, teamsters, contractors and carriers, and linemen)	₱522,770.97	₱628,422.88	₱614,000
Mail transportation (including railway and steamboat postal clerks, mail drivers, teamsters, contractors and carriers' salaries)	129,003.72	138,817.55	160,000
Construction, maintenance, and repairs of telegraph and telephone lines (including linemen's salaries and transportation)	95,511.58	165,261.33	234,000
Contingent expenses	67,358.35	102,721.37	172,000
Total	814,734.62	1,085,223.13	1,380,000

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The approximate cost of each division of the bureau of posts is as follows:

	Fiscal year 1906.	Fiscal year 1907.	Estimated for 1908.
Postal division	₱578,496.44	₱565,946.08	₱690,000
Money-order division	36,236.10	37,641.21	40,000
Telegraph and telephone division	200,002.08	394,242.49	590,000
Postal savings-bank division		37,393.35	60,000
Total	814,734.62	1,035,223.13	1,380,000

In determining these figures a fair proportion of the salaries and wages and other expenses of the offices of the director of posts and of post-offices has been charged to each division, but no credit has been given the postal division for the transportation of the mails of the other divisions.

In making a comparison of the expenses of the bureau for this year with the fiscal year 1906 it must be remembered that the expenses of the telegraph division for the first year are for six months only. However, it will be seen that the cost of the telegraph division for the last year was at the rate of ₱5,761.67 less per annum than the cost for the last six months of the previous year. This reduction was accomplished by further consolidations of the positions of postmasters and telegraph operators, although the salaries of the employees retained at the offices were materially increased. The reduction was even greater than this figure, as during the year we took over 9 additional telegraph offices and 58½ miles, or 94.1 kilometers, of telegraph lines from the signal corps.

The apparent reduction in the cost of the postal division, although there was an increase of ₱9,723.83 in the cost of mail transportation, is explained by the fact that the portion of office expenses charged to the telegraph division for the fiscal year 1906 pertains to six months only and that the postal savings bank division was not started until during the last year. The expenses of the telegraph and postal savings-bank divisions are commented upon under their respective heads.

The increase in the estimate of expenses for the year 1908 is caused principally by the fact that we will have all of the telegraph service in operation during this year.

POSTAL DIVISION.

The new postage and special-delivery stamps and books of postage stamps ordered during the fiscal year 1906 were received and placed on sale in August, 1906. The following is a description of the new stamps:

Denomination.	Portrait.	Color.
2-centavo	Rizal	Green.
4-centavo	McKinley	Red.
6-centavo	Magellan	Purple.
8-centavo	Legaspi	Dark brown.
10-centavo	Lawton	Blue.
12-centavo	Lincoln	Magenta.
16-centavo	Sampson	Dark lilac.
20-centavo	Washington	Light brown.
26-centavo	Carriedo	Slate.
30-centavo	Franklin	Olive.
1-peso	Coat of arms	Orange.
2-peso	Coat of arms	Black.
4-peso	Coat of arms	Sapphire blue.
10-peso	Coat of arms	Dark green.

The design of the 20-centavo special-delivery stamp is a view of Mount Mayon with a Filipino messenger boy in the foreground, and the color is light blue.

The stamp books are of two sizes and kinds: One containing 24 2-centavo stamps and the other 12 4-centavo stamps, and each kind sells for 50 centavos per book. On the cover of each book there is printed a brief statement calling attention to the advantages of the special-delivery, registry, money-order, and postal savings-bank systems, printed in both English and Spanish.

The 14 plates for the new postage stamps cost ₱5,958.10, which expense will not again be necessary until the plates are worn out or new designs are

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adopted. The 2, 4, 10, and 20 centavo stamps are manufactured at a cost, exclusive of the plates, of ₱0.16132 per thousand, and the other denominations cost ₱0.24758 per thousand. The cost of the plate for the special-delivery stamp was ₱115.40, and the cost for the manufacture of the stamps, exclusive of the plate, is ₱0.49518 per thousand. The stamp books containing 12 4-centavo stamps cost ₱7.185 per thousand and those containing 24 2-centavo stamps ₱8.505 per thousand, exclusive of the cost for the printing of the stamps, which is the same as for those printed in sheets.

Subsequently, orders were placed for the manufacture of new postal cards, envelopes, and newspaper wrappers. Two kinds of postal cards were ordered, 2-centavo and 4-centavo, single. No double postal cards—one-half being a reply part—were ordered, as heretofore there has been only a very small call for them. Three kinds of stamped envelopes were ordered, 2-centavo and 4-centavo letter size and 4-centavo official size. The order for the newspaper wrappers is for the 2-centavo kind. The first supply of these new postal cards, envelopes, and wrappers is expected to arrive by the next mail from the United States.

When the new postage and special-delivery stamps were placed on sale all outstanding stamps of the old issue in the hands of postmasters were called in and detroyed by a special committee of three appointed by the Governor-General. In all, this committee destroyed stamp stock to the value of ₱232,356.82. By calling in and destroying this old stock the possibility of confusion on the part of Filipino postmasters was materially reduced, and at the same time it enabled us to get rid of a considerable amount of stamp stock in the hands of postmasters which had become more or less damaged.

On July 1, 1906, we had 476 post-offices established. During the year 26 new offices were established and 3 reestablished, so that at the close of the fiscal year there were 505 post-offices, distributed as follows:

Province.	Number of municipalities.	Number of post-offices in municipalities.	Number of post-offices in barrios.	Total number of post-offices.
Albay	22	13	0	13
Ambos Camarines	35	27	1	28
Antique	11	7	0	7
Bataan	8	6	0	6
Batangas	17	16	0	16
Benguet	16	1	1	2
Bohol	33	15	0	15
Bulacan	15	13	0	13
Cagayan	22	13	0	13
Capiz	22	14	0	14
Cavite	12	11	1	12
Cebu	41	33	0	33
Ilocos Norte	10	10	1	11
Ilocos Sur	21	13	1	14
Iloilo	17	15	1	16
Isabela	10	7	0	7
La Laguna	21	17	1	18
La Union	12	12	0	12
Lepanto-Bontoc	21	4	0	4
Leyte	36	21	0	21
Manila	1	1	0	1
Mindoro	8	1	0	1
Misamis	11	10	0	10
Moro	15	11	3	14
Negros Occidental	22	22	1	23
Negros Oriental	14	14	1	15
Nueva Ecija	14	13	0	13
Nueva Vizcaya	6	5	0	5
Palawan	6	4	1	5
Pampanga	16	16	2	18
Pangasinan	41	32	0	32
Rizal	19	14	1	15
Romblon	6	1	0	1
Samar	32	15	0	15
Sorsogon	29	21	0	21
Surigao	12	6	0	6
Tarlac	11	10	0	10
Tayabas	24	18	0	18
Zambales	8	7	0	7
Total	697	489	16	505

It was intended that during the last year the postal service would be extended until a post-office was established in each municipality outside of the non-Christian tribe provinces, but the falling off in revenues estimated for the year pre-

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vented the completion of these extensions, as there were not sufficient funds to pay mail transportation and the salaries of postmasters. It is believed that the appropriations and revenues for the fiscal year 1908 will be sufficient to complete these extensions.

The free-delivery letter carrier service recommended from time to time during the last six years, and which was finally authorized by the Commission in act No. 1679, for the collection and delivery of mail at each post-office in the provinces will be a means of materially improving the postal service. The Filipinos, and others except Americans, have never been accustomed to going to a post-office for their mail prior to American occupation, as the Spanish Government, like all European governments, maintained a delivery service for the delivery and collection of mail from residences. While it is true the Spanish Government maintained this service by allowing the carriers to collect, with certain exceptions, a fee on each piece of mail delivered, the people preferred to pay this fee rather than go to the post-office for their mail. It is also true that something of a free-delivery service was maintained in most municipalities under the provisions of paragraph "gg," section 39, of the municipal code, which was intended by the Commission to provide a delivery service, but it was never satisfactory. The bureau of posts had no control over it and the carriers ostensibly employed for the service were often used for other work. The mails were frequently lost or held indefinitely in the municipio. All of this resulted in a poor service and the bureau of posts received much of the blame, although it had no power to regulate it or correct evils.

For the free-delivery service in Manila 17 letter carriers are employed. During the year these carriers delivered 1,268,402 and collected 1,217,078 pieces of mail from street letter boxes.

At the commencement of the year there were 52 publications printed in the Philippines admitted to the mails at second-class rates of postage and 4 newsdealers in Manila who had the same privilege. During the year 24 new publications were admitted and 18 publications and 1 newsdealer privilege discontinued. On June 30, 1907, there were 58 publications and 3 newsdealers having second-class postage privileges, as follows:

American Book and News Company, Manila; Book Exchange, Manila; J. R. Edgar & Co., Manila.

Newspapers and periodicals.	Where published.	Language.	Frequency.
Far Eastern Review	Manila	English	Monthly.
Philippine Christian Advocate	do	do	Semimonthly.
Philippine Military Journal	do	do	Do.
The Manila American	do	do	Daily.
The Manila Cablenews	do	do	Do.
The Manila Times	do	do	Do.
The Philippine Gossip	do	do	Weekly.
Philippine Education	do	do	Monthly.
The Philippine Journal of Science.	do	do	10 times a year.
The Weekly American	do	do	Weekly.
The Monthly Sermon and Reporter.	do	do	Monthly.
El Comercio	do	Spanish	Daily.
El Grito del Pueblo	do	do	Do.
El Libertas	do	do	Do.
El Mercantil	do	do	Do.
La Revista Filipina	do	do	Monthly.
La Jurisprudencia	do	do	Semimonthly.
Excelsior	do	English and Spanish	Do.
Free Press	do	do	Weekly.
Official Gazette	do	do	Do.
The Daily Bulletin	do	do	Daily.
Ang Kapatid ng Bayan	do	Tagalog and Spanish	Do.
El Renacimiento	do	do	Do.
La Democracia	do	do	Do.
La Estrella de Antipolo	do	do	Weekly.
La Solidaridad	do	do	Do.
La Independencia	do	do	Daily.
Vida Filipina	do	do	Do.
Ang Bagong Araw	do	Tagalog	Monthly.
La Igualidad	Bacolod	Spanish	Triweekly.
La Union	do	do	Daily.
Ang Katarungan	Cagayan, Misamis	Visayan	Weekly.
The Asiatic	Cavite	English	Do.
Ang Camatuoran	Cebu	Visayan	Do.
Ang Suga	do	do	Triweekly.
Silliman Truth	Dumaguete	English	Semimonthly.

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Newspapers and periodicals.	Where published.	Language.	Frequency.
The Infantryman	Fort William McKinley	do	Weekly.
El Tiempo	Iloilo	Spanish	Daily.
Kadapig sg Banwa	do	Visayan	Do.
Nuevo Heraldo	do	Spanish	Do.
Pearl of the Orient	do	English	Quarterly.
Ang Manugbantala	do	Visayan	Monthly.
Pamatan-on	do	do	Weekly.
El Heraldo Bicol	Legaspi	Bicol and Spanish	Semiweekly.
Pilridel	Malolos	Tagalog and Spanish	Semimonthly.
La Paz	Nueva Caceres	English and Spanish	Do.
El Imparcial	San Fernando, Pampanga.	Pampangan and Spanish.	Triweekly.
Daguiti Naimbaga Damag	San Fernando, La Union	Ilocano	Weekly.
La Voz de Leyte	Tacloban	English and Spanish	Do.
La Voz del Pueblo	Tuguegarao	Cagayan and Spanish.	Do.
Daan-ng Capayapaan	Vigan	Ilocano	Semimonthly.
La Nueva Era	do	Spanish	Weekly.
El Mosajero Catolico	do	Ilocano	Semimonthly.
Dalan to Cappia	do	do	Weekly.
La Juventud Ilocano	do	Ilocano and Spanish	Semimonthly.
Philippine Christian	do	English	Monthly.
Inter-Island News	Zamboanga	do	Weekly.
Mindanao Herald	do	do	Do.

The several offices collected second-class postage as follows:

Office.	Fiscal year 1906.	Fiscal year 1907.
Manila	₱5,532.38	₱6,761.50
Bacolod, Negros Occidental	99.62	90.42
Bacolor, Pampanga	83.92	50.64
Cagayan, Misamis	5.96	8.38
Cavite, Cavite		1.44
Cebu, Cebu	151.22	150.82
Dumaguete, Negros Oriental	5.18	6.14
Fort William McKinley, Rizal	5.56	34.96
Iloilo, Iloilo	279.80	358.28
Legaspi, Albay		10.28
Malolos, Bulacan		22.20
Nueva Caceres, Ambos Camarines	6.20	10.88
Parang, Moro	.60	4.14
San Fernando, Pampanga		4.12
San Fernando, La Union	4.04	11.06
Tacloban, Leyte	13.06	26.62
Tuguegarao, Cagayan	16.08	13.28
Vigan, Ilocos Sur	68.72	83.42
Zamboanga, Moro	6.48	13.26
Total	6,273.82	7,661.84

An item of ₱10,000 for the purchase of post-office boxes for other post-offices was included in the estimate of expenses for the year 1907, but owing to the fact that the revenues fell considerably below the estimate no money could be expended for this purpose. A like item was included in the estimate for the year 1908, and it is hoped that before the close of the year we will be able to install boxes in a number of offices. The advisability of so doing for revenue only, to say nothing on the point of convenience to the public, is shown in the statement of box rents collected during the year.

Office.	Fiscal year 1906.	Fiscal year 1907.
Legaspi, Albay	₱562.66	₱529.32
Tabaco, Albay	146.00	315.00
Tuguegarao, Cagayan		75.84
Cebu, Cebu	1,455.40	1,594.58
Laoag, Ilocos Norte	107.70	90.60
Iloilo, Iloilo	1,891.36	1,977.35
San Fernando, La Union	248.00	181.00
Manila	11,986.70	12,164.70
Sorsogon, Sorsogon	251.00	254.00
Total	16,648.82	17,182.39

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The following is a statement of the registry business for the year as compared with the year 1906:

	Fiscal year 1906.	Fiscal year 1907.	
Total number pieces mail registered at Philippine offices.	245,831	280,044	13 per cent increase.
Number pieces received from United States	34,443	38,585	12 per cent increase.
Number pieces received from foreign countries	52,708	54,536	3.5 per cent increase.
Number pieces sent to United States	39,692	46,328	17 per cent increase.
Number pieces sent to foreign countries	37,687	36,588	3 per cent decrease.
Number pieces sent from one Philippine office to another Philippine office.	168,452	197,128	17 per cent increase.
Number pieces handled by Manila post-office	297,750	331,365	11 per cent increase.

The decrease in the number of pieces of registered mail sent to foreign countries is more than offset by the increase in the number sent to the United States, which may be taken as an indication that despite the rigid enforcement of the customs laws at United States ports the shipping of small parcels of merchandise to the United States and the business relations therewith are on the increase.

Shortly after the beginning of the year contracts were made by the secretary of commerce and police with commercial steamship companies to operate on regular schedules over 13 interisland routes. This service covers most of the important ports in the Philippine Islands at regular periods. The prediction made in last year's report, that knowing in advance the date on which a steamer will sail and the ports to which it will go would be of the greatest advantage, not only to the bureau of posts but to the business interests as well, has been fully realized. The service on route No. 8 has been increased voluntarily by the contractor on account of the increased business caused by running on regular schedule. The mail requirements in the contracts are sufficient to guarantee careful and prompt service. A failure to observe the mail conditions is punishable by a fine to be fixed by the interisland transportation tribune. For the whole year only three fines were imposed on contractors for violating the mail conditions, which amounted to only ₱150.

In addition to the contract commercial steamers the bureau of navigation maintains coast-guard cutters on regular schedules over five routes, which cover points where the commercial business is not sufficient as yet to induce commercial companies to take up the service and adopt regular schedules thereon. To supplement the mail service of the contract steamers and insular government cutters, we have the army transports and other commercial vessels, all of which, taken as a whole, provide much better interisland mail communication and connections than we have had during any previous year since American occupation.

The mail launch maintained in Manila Bay for the transportation of mails to and from steamships costs about ₱10,950 per annum, but it enables the Manila post-office to close outgoing mails thirty minutes to one hour later and to deliver incoming mails from thirty minutes to two hours earlier than before it was employed.

Section 15 of act No. 1510 of the Philippine Commission, granting a concession for railway lines on the island of Luzon to the Manila Railroad Company, canceled the Spanish concession for the railroad between Manila and Dagupan. Consequently the gratuitous mail service required by the Spanish concession ceased April 24, 1907, and thereafter this service must be paid for at a rate agreed upon by the director of posts and the grantee, which for the last year was ₱85.50 per mile of road per annum for all service required, and which is the minimum rate paid for railroad service in the United States. An agreement is now under way whereby payments will be made on the amount of mail carried, to be determined by weighings not less frequent than once in four years. Two other routes, amounting to 22¾ miles, or 36.6 kilometers, in length, were established from Manila to Taytay and San Mateo, Rizal Province, making five routes on lines of this company in operation June 30, 1907, of a total length of 205.12 miles, or 330.24 kilometers, on which mails were carried a total of 169,950 miles, or 273,619.5 kilometers, during the year. On account of the free service above mentioned, payment was made to the company for only 84,718.25 miles, or 136,396.38 kilometers, amounting to ₱7,623.63.

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The following is a summary statement of the inland transportation of mails between post-offices for the year:

Number of contract routes between post-offices	31
Number of miles mails carried thereon (369,224.5 kilometers)	229,332
Cost for year	₱33,471.30
Average cost per mile carried	₱0.14
Number of noncontract routes between post-offices	196
Number of miles mails carried thereon (830,058.04 kilometers)	515,564
Cost for year	₱30,989.65
Average cost per mile carried	₱0.06
Total number of routes between post-offices	227
Total number of miles mails carried (1,199,282.54 kilometers)	744,896
Cost for year	₱64,460.95
Average cost per mile carried	₱0.0865
Number of gratuitous routes between post-offices	5
Number of miles mails carried thereon (13,813.4 kilometers)	8,704
Number of contract routes at close of year	30
Length of same (1,899.8 kilometers), miles	1,180
Number of noncontract routes at close of year	190
Length of same (4,393.6 kilometers), miles	2,729
Number of gratuitous routes at close of year	5
Length of same (67.6 kilometers), miles	42
Total number of routes at close of year	225
Length of same (6,361 kilometers), miles	3,951
Number of routes on which mails were carried during year between post-offices and mail trains or mail steamers	50
Cost at Manila, including mail launch	₱18,353.95
Cost at other offices	₱6,042.72
Total cost	₱24,396.67
Number of routes in operation June 30, 1907	45

Notwithstanding the difficulties to be met with during the rainy season in almost every part of the islands, but very few failures to carry mails on schedule time or to make the intended connections were recorded. With the advancement in road and bridge construction now underway there should, however, be a very material improvement in the land transportation of mails, as it will permit the shortening of schedules and the delivery of mails to interior points in less time than must now be allowed.

The total cost of railroad and other inland transportation of mails shows an increase of ₱18,648.88 over the last fiscal year, caused by an increase in the cost of railroad service of ₱3,110.15, of launch hire at Manila of ₱7,470, of transportation in the Cagayan Valley of ₱1,200, of new routes in the provinces of ₱1,580.05, of extensions or increased frequency on old routes of ₱1,876.93, of the necessary increase in the cost on old routes because of inability to obtain the service at the old rates, of certain routes being in operation for the full year, and of miscellaneous items of ₱3,411.75. However, despite this increase in cost, we have secured sufficient additional service for the money expended to make a reduction of almost 1 centavo in the average cost per mile of mails carried.

During the year the Manila post-office dispatched 18,242 mails, consisting of 20,659 locked pouches and 24,458 bags of paper mail, to provincial post-offices. This shows an increase of 2,015 mails, 2,598 pouches, and 2,168 bags. The Manila post-office received from provincial post-offices 14,980 mails, consisting of 16,118 locked pouches and 5,777 bags of paper mail—an increase of 2,061 mails, 2,235 pouches, and 668 bags. Postal clerks on cutters maintained by the bureau of navigation distributed 3,238 packages of letters and 375 sacks of paper mail—a decrease of 4,860 packages of letters and 753 sacks of papers. These clerks handled 4,765 registered packages and 368 registered sacks—a decrease of 3,370 registered packages and 1,045 registered sacks. They traveled 62,241 miles—a decrease of 27,004 miles. The decrease in this service is explained by coast-guard cutters being replaced by commercial steamers under contract with the government which do not carry postal clerks. That the decrease in mileage is not in proportion to the decrease in the amount of mail handled is due to the fact that coast-guard cutters are now going on long runs to isolated places to and from which the amount of mail carried is not large.

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The following is a concise statement of mails received from and dispatched to the United States:

Number of mails dispatched from the United States	104
Number of pouches of letters dispatched from the United States	706
Number of pouches of registers dispatched from the United States	2,379
Number of sacks of papers dispatched from the United States	14,576
Number of mails sent to the United States	67
Number of pouches of letters sent to the United States	687
Number of pouches of registers sent to the United States	964
Number of sacks of papers sent to the United States	1,876

There was a sufficient number of consolidations of the several dispatches of mails from the United States while en route to the islands to reduce the number of arrivals here to 87, and consolidations en route of the 67 mails dispatched to the United States reduced the number of different arrivals at United States ports to 53.

There were sent to United States ships and troops stationed in foreign ports 875 bags of mail and 188 were received from such sources.

The following statement shows the exchanges of mails with foreign countries:

Number of mails received from foreign countries	588
Number of bags received from foreign countries	5,324
Number of mails sent to foreign countries	438
Number of bags sent to foreign countries	2,709
Net weight of letters sent to foreign countries, in grams	5,995,825
Increase, in grams	436,326
Increase, per cent	7
Net weight of prints sent to foreign countries, in grams	16,223,487
Increase, in grams	1,206,139
Increase, per cent	7

The payments made to commercial vessels for carrying our mails to foreign ports amounted to ₱14,773.39, and to foreign countries for transportation of our mails, ₱16,859.06. The increase in the cost of railroad and other inland transportation of mails, as already shown, amounted to ₱18,648.88; but to partly offset this there were reductions in other items, so that the net increase in the cost of mail transportation of all kinds was ₱9,723.83.

The following statements show the work in the dead-letter office of this bureau for the year:

ARTICLES RECEIVED.

Source from which received.	Registered articles.	Ordinary letters.	Ordinary packages.	Total.
On hand undisposed of July 1, 1906:				
United States	433	6,119	278	6,830
Foreign countries	49	1,465	249	1,763
Manila post-office	841	39,079	1,710	41,630
Other Philippine sources	34	379	9	422
Returned after attempt to find sender		2,417		2,417
Total to be accounted for	1,357	49,459	2,246	53,062

ARTICLES DISPOSED OF.

Disposition made.	Registered articles.	Ordinary letters.	Ordinary packages.	Total.
Returned to United States	212	7,318	347	7,877
Returned to foreign countries	449	2,153	319	2,921
Request matter, returned to senders in the Philippines	504	2,921	115	3,540
Opened and returned to senders		20,737	11	20,748
Containing money, drafts, stamps, etc., returned to senders		223	5	228
Containing other valuable matter		51	150	201
Destroyed	5	15,930	1,106	17,041
Filed, containing money, drafts, stamps, etc		45	1	46
Filed, containing other valuables	187	81	192	460
Total accounted for	1,357	49,459	2,246	53,062

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At the close of the year there were on file in the dead-letter office 199 registered letters and packages, 30 ordinary letters containing money, drafts, or stamps, and 568 letters and packages containing other valuables. During the year money to the amount of ₱152.22 was taken from letters which had been on file more than one year and turned into the postal revenues.

During the year 26,251 pieces of mail were advertised at the Manila post-office. Of this number only 4,296, or less than 17 per cent, were delivered, the balance being turned into the dead-letter office for disposition.

MONEY-ORDER DIVISION.

The following is a statement of the money-order business for the fiscal year as compared with the fiscal year 1906:

	Fiscal year 1906.	Fiscal year 1907.
Number orders issued	94,261	98,813
Amount of orders issued	$3,687,126.81	$3,229,446.09
Fees collected	$16,401.44	$19,658.59
Number orders paid and repaid	48,380	58,601
Amount of orders paid	$1,923,208.20	$2,211,988.95
Average amount of each order issued	$39.10	$32.69
Average amount of each order paid	$39.95	$39.45
Deposits of money-order funds received at Manila from provincial offices	$1,720,735.59	$1,787,648.55
Amount of money-order funds sent to provincial offices to pay orders	$29,208.00	$87,915.16
Amount of invalid orders deposited in insular treasury	$3,479.32	$1,255.96
Amount of Philippine orders paid in United States	$2,153,450.79	$1,262,269.02
Amount of United States orders paid in Philippines	$157,308.78	$178,542.03

From the above it will be seen that there was an increase of nearly 5 per cent in the total number of orders issued, while the total amount of all orders issued was more than 12 per cent less than for the year 1906, the decrease in the average amount of each order issued being $6.41. The increase in the fees collected on money orders issued is caused by the new schedule of fees which went into effect May 15, 1906. The increase in the number of money orders issued is entirely in the provinces, as there was a reduction of 7,771 in the number issued at Manila.

During the year the money-order business was opened at Parang and Puerto Princesa and reestablished at Corregidor. Arrangements are now under way to extend this service to some 15 additional offices.

TELEGRAPH DIVISION.

The following is a summary of the telegraph business, including military offices operated the whole or part of the year by the signal corps:

Number of messages sent.	From military offices.	From bureau of posts offices.	Total.
Insular government business	30,325	38,119	68,444
Provincial government business	7,311	9,016	16,327
Municipal government business	1,279	2,514	3,793
Commercial and half-rate business	82,089	118,386	200,475
War Department official business	99,729	8,485	108,214
Navy Department official business	2,385	5,058	7,443
Other United States Government departments' official business	350	276	626
Total	223,468	181,854	405,322

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Value of messages sent.	From military offices.	From bureau of posts offices.	Total.
Insular Government business	₱18,931.12	₱35,334.88	₱54,266.00
Provincial government business	9,900.48	10,634.58	20,535.06
Municipal government business	1,438.14	2,552.94	3,991.08
Commercial and half-rate business	62,564.66	95,363.46	157,928.12
Total telegraph revenues	92,834.40	143,885.86	236,720.26
War Department official business, free	203,622.88	14,855.70	218,478.58
Navy Department official business, free	3,110.48	7,088.60	10,199.08
Other United States Government departments' official business, free	367.22	166.30	533.52
Total of free business	207,100.58	22,110.60	229,211.18
Total value of all messages sent	299,934.98	165,996.46	465,931.44

Mileage insular telegraph lines June 30, 1907 (3,933.2 kilometers)	2,443
Mileage insular cables June 30, 1907 (384.7 kilometers)	239
Number miles military telegraph wires transferred to insular government during year (94.1 kilometers)	58.50
Number miles military cables transferred to insular government during year (36.6 kilometers)	22.79
Number miles insular telegraph wires converted into telephone during year (313.9 kilometers)	195
Number miles insular telephone wires converted into telegraph during year (251.1 kilometers)	156
Number miles insular telegraph lines constructed during year (222.1 kilometers)	138
Number miles insular telegraph lines reconstructed during year (522.4 kilometers)	324.50
Number miles insular telegraph lines abandoned and serviceable material recovered during year (64.4 kilometers)	40
Number of insular telegraph offices closed during year	16
Number of insular telegraph offices opened during year	7
Number of military telegraph offices transferred to insular government during year	9
Number of insular telegraph offices June 30, 1907	98
Number of military offices June 30, 1907	61
Number of telephones in service June 30, 1907	411
Mileage insular telephone lines June 30, 1907 (3,790.7 kilometers)	2,354.50
Number miles insular telephone lines constructed during year (43.4 kilometers)	27
Number miles insular telephone lines reconstructed during year (216.5 kilometers)	134.50
Number miles insular telephone lines abandoned and serviceable materials recovered during year (90.1 kilometers)	56

During the three months following the close of the year all but 22 of the telegraph offices operated by the signal corps, and the lines pertaining thereto, were transferred to this bureau. Of the remaining offices 7 will subsequently be transferred when certain lines on the island of Samar are no longer required for military purposes. The 15 remaining military offices to be operated by the signal corps will all be located at military posts or on military reservations. Under the agreement reached between the Governor-General and the commanding general, Philippines Division, United States Army, the latter is to operate and maintain a cable ship for two years from October 4, 1907, for which the insular government will pay the cost of operating during the time the ship is used on cable work, and all departments and bureaus of the United States Government will have free telegraph service during the same term. All revenues collected at military offices on other telegraph business are to go to the insular government, but signal corps operators are to receive compensation for the handling of this business, you having since approved the payment to these operators of 10 per cent of the revenues of their respective offices to compensate them for the handling of commercial telegrams.

To take over these lines and offices that have been transferred to us since June 30, it was necessary to secure the discharges for some 35 soldiers of the signal corps for employment in this bureau. The operating force of the tele-

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graph division is now composed of 40 American and 72 Filipino postmasters, who also perform the duties of telegraph operators, and 40 American and 23 Filipino operators; also 1 American and 53 Filipino student operators. It has been found by experience that the Filipino operator when stationed away from his home becomes more or less dissatisfied and is more likely to go wrong than if stationed in his home town. We have therefore adopted the plan of employing as students intelligent young Filipinos who have been certified by the supervising teacher as having passed through at least the fourth, and preferably the fifth grade, of the English course in the public schools, and stationing them at their homes. It is believed that in the course of six months we will be able, through these students and with those turned out by the telegraph school in Manila operated by the bureau of education, to fill nearly all vacancies in positions now occupied by American operators, so that after that time it will not often be necessary to secure American operators either from the United States or from the signal corps. These student operators employed in our offices are, as a rule, making remarkable progress in the study of telegraphy. Furthermore, many of the Filipino operators who have been employed for several years have advanced to such a degree of ability that they can now work in almost any office or on any line in the islands.

The provincial telephone service maintained by the telegraph division is much more difficult to handle than any other part of the work of this bureau. While the necessity for a central control of all means of communication by the general government is fully appreciated, I do not believe that the telephone service can ever be handled in a manner satisfactory to the users of it until it is put under local control. It is on this account that I have heretofore recommended that provincial officials of each province be given authority to construct, maintain, and operate telephone lines within their respective provinces. The administration from Manila of a provincial telephone system located at a distance is not only more difficult, but more expensive as well, than if it could be controlled locally. The fact, that the telephone service in any province is now controlled by the insular government and managed from Manila will always give greater room for complaint by the officials and people of the province than if it was directly under their own control. However, the plan which you have recently authorized, providing that the province and municipalities thereof shall reimburse the bureau of posts for all expenses for construction, maintenance, and operation of telephone lines within the province, will probably cause a material reduction in these complaints as well as in the requests for extensions of lines.

POSTAL SAVINGS BANK DIVISION.

The law providing for the establishment of postal savings banks in the Philippine Islands was enacted by the Philippine Commission May 24, 1906, but it was not until October 1, 1906, that the necessary forms required for the operation of the bank were secured. On that date the first bank was opened in the Manila post-office and subsequently extended to Cavite, Cebu, Iloilo, Zamboanga, and other offices, until at the close of the year the service had been authorized at 235 offices. Of these, 9 were of the first class, 86 of the second class, and 140 of the third class.

A summary of the transactions of these banks, by months, is given in the following tables:

Individual depositors' accounts.

Month.	Accounts opened.	Accounts closed.	Accounts standing open.	Net increase in open accounts.
1906.				
October	214	1	213	213
November	168	13	368	155
December	239	9	598	230
1907.				
January	353	28	923	325
February	243	33	1,133	210
March	270	31	1,372	239
April	416	75	1,713	341
May	455	70	2,098	385
June	318	87	2,329	231
Total	2,676	347	2,329	

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Statement of deposits from October 1, 1906, to June 30, 1907.

Month.	Number.	Average.	Amount.	Interest added.	Total to depositors' credit.
1906.					
October	287	₱265.16	₱76,108.43		₱76,108.43
November	307	208.05	63,871.47	₱0.99	63,872.46
December	498	139.74	69,439.06	1.78	69,440.84
1907.					
January	830	127.97	106,089.37	8.62	106,097.99
February	810	105.23	85,237.45	19.28	85,256.73
March	882	94.16	83,052.83	40.39	83,093.22
April	1,156	85.81	99,206.79	93.90	99,300.69
May	1,317	84.50	111,278.75	112.10	111,390.85
June	1,180	77.85	92,081.88	3,324.46	95,406.34
Total	7,267	108.21	786,361.08	3,601.52	789,962.55

Statement of withdrawals, October 1, 1906, to June 30, 1907.

Month.	Number.	Average.	Amount.	Net deposits.
1906.				
October	25	₱49.40	₱1,235.00	₱74,868.43
November	86	102.02	9,998.54	53,873.92
December	125	106.14	13,267.78	56,173.06
1907.				
January	185	147.89	27,360.12	78,737.87
February	188	138.15	25,972.70	59,284.03
March	268	165.11	44,250.14	38,843.08
April	313	166.50	52,117.11	47,183.58
May	372	129.33	48,112.45	63,278.40
June	396	146.94	58,185.37	37,220.97
Total	1,958	143.25	280,499.21	509,463.34

Of the above withdrawals, 103 were made by telegraph at an average cost to the depositor of ₱1.14 for each withdrawal.

Classification of depositors as to nationality.

Nationality.	Number of depositors.	Per cent of total.
Americans	1,616	60.4
Filipinos	944	35.3
Europeans	60	2.2
Asiatics	45	1.6
Societies	11	.5
Total	2,676	100

Classification of depositors as to occupation.

Occupation.	Number of depositors.	Per cent of total.
Professional	346	12.9
Clerical	408	15.3
Student class	95	3.6
Agricultural	50	1.8
Mercantile	56	2.1
Soldiers and sailors	496	18.5
Policemen	53	2.0
Artisans	367	13.7
Domestics	54	2.0
Laborers	376	14.1
Children	175	6.5
Women, no occupation	132	5.0
Miscellaneous and unclassified	57	2.2
Societies	11	.3
Total	2,676	100.0

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The classification "professional" includes, in addition to those usually so classified, those employees of the government whose duties are such as to throw them into this class rather than into the "clerical" class and also a large number of Filipino teachers who can not well be classed under any other head. The "student class" includes all students over the age of 15, those under this age being classified as "children." Under "soldiers and sailors" are included all officers and enlisted men of the army and navy, marines, and the constabulary.

Classification of depositors, miscellaneous.

Classification.	Number of depositors.	Per cent of total.
Married	782	29.2
Male	2,354	87.9
Female	310	11.5

The following is a classification of depositors' balances without regard to nationality:

Amount (in pesos).	Number of accounts.	Increase in number.	Average accounts.	Amount of balance.
		Per cent.		
Under 50	1,155	15.5	₱11.93	₱11,941.61
51 to 100	240	6.6	71.01	17,043.72
101 to 300	372	19.2	167.25	62,217.70
301 to 500	169	15	376.36	63,606.11
501 to 1,000	208	2.4	694.65	144,487.83
1,001 to 5,000	133	52.8	1,462.32	194,489.70
5,001 and over	2	50	7,838.33	15,676.67
Total	[a] 2,279	14.8	223.54	509,463.34

[a] Fifty accounts remain open with no credit balances.

The following is a classification of depositors' balances according to nationality:

Amount (in pesos).	Accounts of Americans.		Accounts of Filipinos.		Accounts of Europeans.		Accounts of Asiatics.	
	Number.	Amount.	Number.	Amount.	Number.	Amount.	Number.	Amount.
Under 50	410	₱5,701.60	722	₱5,880.59	14	₱179.02	9	₱180.40
51 to 100	161	11,801.80	74	4,890.05	3	191.50	2	160.37
101 to 300	300	51,343.65	40	6,062.20	17	2,547.56	15	2,264.29
301 to 500	142	53,356.38	19	7,330.31	2	775.62	6	2,143.80
501 to 1,000	182	126,655.30	17	11,509.42	6	3,904.36	3	2,418.75
1,001 to 5,000	122	176,865.56	8	10,524.83	3	7,099.31	------	------
5,001 and over	2	15,676.67	------	------	------	------	------	------
Total	1,319	441,400.96	880	46,197.40	45	14,697.37	35	7,167.61

Section 9 of the bank act provides for the issue and sale of postal savings bank stamps in the denominations of 5, 10, and 20 centavos, respectively, which shall be for sale at every postal savings bank. These stamps were ordered in July, 1906, and received in the following February. The 5-centavo stamp bears a large figure 5 in the center surrounded by tropical palms and cocoanut trees, and the color is sepia. The 10-centavo stamp portrays the Parian gate of the old walled city of Manila, and the color is carmine. The 20-centavo stamp portrays a Philippine rice paddy during the planting season, with mountains in the background, and the color is light green. The plates for these stamps cost ₱2,064.30. The cost for the manufacture of the 5-centavo stamps, exclusive of plates, is ₱0.2414 per thousand; for the 10-centavo, ₱0.6436 per thousand, and for the 20-centavo, ₱1.0296 per thousand. As these stamps are designed especially for the use of the school children and were available only a few days before the close of the school year, the sales were rather small. The total

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sales to June 30 at Manila amounted to ₱263.90, and at other offices ₱1,592.40. Of these, stamps to the value of ₱1,219 were deposited on interest-bearing accounts, thus leaving outstanding stamps June 30, subject to redemption, amounting to ₱637.30.

The expenses of the bank were as follows:

Salaries of chief of postal savings bank division, clerks in the office of the director of posts, postmasters, and clerks in post-offices	₱15,660.00
Printing and binding special forms	11,910.99
Other supplies, including stationery and furniture and repairs to same; proportional part of rent of offices, cablegrams, and traveling expenses of district inspectors	2,159.50
Postal savings bank stamps	4,061.34
Interest paid to depositors	3,601.52
Total	37,393.35

As a credit to this expense we have the sum of ₱6,495.36 for interest earned on the investments of the bank funds, but not due to be paid until after the close of the year. The expense for the supplies for the bank was materially larger than it will be during the next year, and at the close of the fiscal year the supplies on hand and not in use amounted to approximately ₱10,000.

The investment of the funds of the postal savings bank is, by the provisions of section No. 18 of act No. 1493, placed in the hands of an investment board composed of the secretary of commerce and police, the secretary of finance and justice, the director of posts, the insular treasurer, and a business man, appointed by the Governor-General. Shortly after the first bank was opened in Manila the Governor-General appointed Mr. Barry Baldwin, of Manila, to fill this position.

The investment of the funds of the bank was at that time by law limited to bonds or other evidence of indebtedness of the United States; bonds or other evidence of indebtedness of the insular government, of the city of Manila, or of any municipality, issued in pursuance of the act of Congress; interest-bearing deposits under proper security in any bank situated in the United States or in the islands having an unincumbered paid-up capital equivalent to ₱1,500,000, and stocks or shares of banks doing business in the Philippine Islands having a paid-up capital of ₱1,500,000. At the time the first funds of the bank were available for investment there appeared to be no bonds or other evidences of indebtedness of the United States or of the Philippine Islands nor stocks or shares of banks doing business in the islands that could be purchased at a rate making their investment profitable to the bank; therefore, as a temporary measure and until better means of investment could be found, it was decided by the board to place the funds of the Bank in interest-bearing deposits in the banks of Manila meeting the requirements of the law. The following is a table of the funds so invested in each bank during the year, all of which bear interest at the rate of 3½ per cent per annum:

Bank.	Amount.
International Banking Corporation	₱170,000.00
Hongkong and Shanghai Banking Corporation	120,000.00
Chartered Bank of India, Australia, and China	130,000.00
Banco Español-Filipino	70,000.00
Total	490,000.00

All of the above banks meet the requirements of the law and the deposits in them are protected by surety bonds filed with the Bureau of Insular Affairs.

This section of the bank law was amended March 22, 1907, by act No. 1620, so as to authorize the investment of the funds of the bank in first mortgages or deeds of trust to the bank of improved and unincumbered city real estate, with registered title, situated in the cities of Manila, Iloilo, Cebu, and Zamboanga, and upon first mortgages or deeds of trust to the bank of actually cultivated improved and unincumbered agricultural land in the provinces with title registered in accordance with the land registration act. However, no investments under this amendment were made up to the close of the year, but advantage of this authority has since been taken by the board. These

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provisions, widening the field of investment of funds of the bank, will enable the institution to reach a self-supporing basis much sooner than the original provisions of the law would have allowed.

The foregoing tabulated statements show that about 58 per cent of the depositors with credit balances June 30 were Americans and 39 per cent Filipinos, and that these American depositors held 86.6 per cent of the deposits, while the Filipino depositors held only 9 per cent. This is accounted for by the fact that during the first few months the bank gathered in the larger part of the surplus savings of the depositors, who were at that time mostly Americans. The deposits of the later months represent more nearly the current savings of the depositors, and the figures show an increasing number of Filipino depositors. Up to June 30, 944 accounts, representing 35.3 per cent of the total, had been opened by Filipinos, but in the succeeding three and one-half months 923 additional Filipinos became depositors. The success of the bank must depend entirely upon the interest taken in it by the Filipino people. The fact that in the last three and one-half months nearly as many accounts were opened by Filipinos as during the preceding nine months is, I think, very satisfactory evidence that the Filipinos are likely within a few years to make a very large use of the banks. On the other hand, it is very probable that for some years to come the savings bank will be little more than a temporary depository of the small savings of the common people, as the wants and daily requirements of this class are likely to grow faster than their incomes. Doubtless the most valuable means of furthering the use of the savings bank is the cooperation of the schools, which has been cordially extended. The director of the bureau of education, as well as all officials and teachers, have taken a great interest in the work and assisted in every possible way to bring the bank to the attention of the school children. In addition to this, steps have already been taken for the insertion of a large amount of illustrated material in a series of arithmetics now being published for the use of the schools. The prizes which you have offered to school children are yielding very gratifying results and are doubtless responsible to a great extent for the rapid increase in the number of Filipino depositors. It is probable that something of this kind might be made a permanent feature of the work of the bank. The benefits to be derived would be ample compensation for the insignificant expense involved.

In order to give the bank publicity the rules and regulations have been printed in pamphlet form in both English and Spanish and distributed liberally from every post-office and through the schools. In addition to this a folder has been printed in English, Spanish, Tagalog, Pampangan, Pangasinan, Ilocano, Ibanag, Bicol (Ambos Camarines), Bicol (Albay), Visayan (Cebu), Visayan (Negros), Chinese, and Japanese, calling special attention to the value of saving. It is also our intention to have the rules and regulations of the bank printed in at least some of these dialects. The question of securing the services of several thoroughly competent Filipinos, well versed in the native dialects, to go from place to place for the purpose of explaining to the common people the nature of the postal savings banks and encouraging their use is also under consideration. In fact, it appears quite necesseary that something of this kind be done to dispel the opposition to the banks that now exists in some parts. We have received frequent reports from our postmasters that the common people of the Philippines have been informed in some way that in view of the possibility of war between the United States and Japan they should not deposit their money with the government, as it would probably be lost. In other parts the people have been so imbued with the idea of early independence that they object to putting their money in the hands of the government to have it returned to them when independence is secured. It is probable that all this is the work of political demagogues, but nevertheless to overcome it will no doubt require the services of prominent Filipinos in whom the people have the fullest confidence.

On the whole, the progress made by the bank during its first year is, I think, very satisfactory and has more than come up to the expectations of the government. The total amount of interest paid to depositors was ₱3,601.52, of which ₱3,147.14 was added to depositors' balances June 30, in accordance with the provisions of section No. 10, paragraph (*c*), of the bank act, and the balance was paid during the year to depositors who closed their accounts. The net deposits have increased in round numbers from ₱509,000 June 30 to ₱690,000 this date.

Under the law, banks of the third class may receive deposits only by means of postal savings bank stamps, and no single deposit may be received at a bank of this class in excess of ₱25, nor may one account be credited with more than

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two deposits in the same month. It is believed that the restrictions limiting deposits in banks of this class to stamps only should be removed and that such banks should be authorized to receive deposits in money as well as stamps. Limiting these banks to the acceptance of stamps only makes an unnecessary expense for the manufacture of stamps and causes much extra work in the handling of the stamped cards. It is also believed that a change in the law should soon be made permitting postmasters in the provinces to pay withdrawals of small amounts, say not exceeding ₱10, to depositors without first obtaining authority from the central office. Some of the European countries operating postal savings banks have recently adopted this provision. By this means it enables a provincial depositor to withdraw funds in case of an emergency without the long delay necessary to get authority from Manila or the expense for telegraphic authority. It appears advisable, however, not to make recommendations too soon for changes in the law as first enacted, and therefore as yet no specific recommendation for these changes has been submitted.

CONCLUSION.

During the year 73 cases, including incomplete investigations carried over from the year before and involving embezzlement of postal or money-order funds, theft of valuable contents from mail matter, registered and ordinary, alleged losses of mail, raising of money orders, two fake robberies of post-offices, etc., were investigated. As a result, 12 postmasters and other employees were convicted on the charge of infidelity in the custody of documents for robbing the mails, and there remain two cases on the same charge which have not been tried; 4 convictions of postmasters for embezzlement of public funds were secured; 3 postmasters and one clerk were required to pay the value of the contents of mail lost or stolen through their carelessness; 3 persons not in the employ of this bureau were convicted of raising money orders; 2 for theft of mail, and 1 was required to pay the value of a registered parcel for accepting delivery when he knew it was not intended for him; 1 lineman was convicted for writing obscene matter on the outside of an envelope of a letter addressed to another; and 4 employees were dismissed from the service for theft of mail or gross carelessness in handling the same, causing loss, without attempt to convict in court on account of insufficient evidence.

Two years ago the Commission was disposed to abolish the inspectors employed in this bureau and have this work done by district auditors. I think the number of cases above cited, all of which, with the exception of three, required a full knowledge of postal work, demonstrates beyond question the necessity for the employment of inspectors in this bureau who have a thorough knowledge of all branches of the work.

Although but eighteen months have elapsed since the beginning of the combination of the telegraph service of the islands with the postal service was made, it can be said beyond any question of doubt that such a combination can be worked satisfactorily and economically. By this combination, and also with the postal savings bank subsequently established, we are able to effect larger economies by securing more labor from each employee and at the same time give him better pay for his services. Telegraph operators are, as a rule, keen to learn postal work in order to secure these advantages, and many postal employees are for the same reasons making a zealous study of telegraphy. There can be no question about the scheme being successful, and in a short time we will be able to demonstrate this fact to the home Government.

Respectfully submitted.

C. M. COTTERMAN,
Director of Posts.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

REPORT OF CHIEF POSTAL SAVINGS BANK DIVISION.

OFFICE OF THE DIRECTOR OF POSTS,
Manila, P. I., September 3, 1907.

SIR: In accordance with the provisions of section No. 2 of act No. 1493, United States Philippine Commission, I have the honor to submit herewith my annual report covering the operations of the postal savings bank division for the fiscal year ended June 30, 1907.

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The law providing for the establishment of postal savings banks in the Philippine Islands was enacted by the United States Philippine Commission May 24, 1906, and the writer was appointed chief of the postal savings bank division on July 11 of the same year. The necessary forms having been prepared, the Manila office was opened for the transaction of business October 1, 1906. Other offices were subsequently established as conditions seemed to warrant, until at the close of the fiscal year, June 30, there were 235 offices open for the transaction of business. Of these offices 9 were of the first class, 86 of the second class, and 140 of the third class. Business was transacted in 125 of these offices as shown in Exhibit A, referred to later.

STATEMENT OF RESOURCES AND LIABILITIES.

The following is a statement of the resources and liabilities of the postal savings bank as they appeared at the close of business, June 30, 1907:

Resources.		Liabilities.	
Deposits with Hongkong and Shanghai Bank	₱120,000.00	Individual depositors' balances	[a] ₱509,463.34
Deposits with Chartered Bank	130,000.00	Stamps outstanding	637.30
Deposits with International Bank	170,000.00		
Deposits with Banco Español-Filipino	70,000.00		
In hands of insular treasurer	5,000.00		
In hands of cashier, Manila post-office	7,261.66		
In hands of outside postmasters	7,838.98		
Total	510,100.64	Total	510,100.64

[a] The sum of ₱3,147.14 interest was added to depositors' accounts June 30, in accordance with the provisions of section 10 (*c*) of act No. 1493, and the sum of ₱177.32 paid on closed accounts in June, which, with interest paid in previous months, ₱454.38, makes a total of ₱3,601.52 for the year.

The balance sheet at the end of the fiscal year appears as follows:

Balance sheet, June 30, 1907.

Account.	Debit.	Credit.
Postmasters' stamp account	₱364,058.10	
Cash in hands of postmasters	15,100.64	
Deposited with insular treasurer	5,000.00	
Time deposits with—		
Chartered Bank of India, Australia, and China	130,000.00	
International Banking Corporation	170,000.00	
Hongkong and Shanghai Banking Corporation	120,000.00	
Banco Español-Filipino	70,000.00	
Loss and gain	[a] 37,393.35	
Stamp stock		₱364,058.10
Stamp sales and deposit account (representing undeposited stamps)		637.30
Individual depositors' balances		509,463.34
Bureau of posts appropriation		37,393.35
Total	911,552.09	911,552.09

[a] Against this item, representing the total expenses of the postal savings bank for the fiscal year, including interest, may be set the sum of ₱6,495.36 interest accrued, but not paid, on time deposits with the various banks.

BUSINESS TRANSACTED.

A statement of the operations of the various banks for the fiscal year is presented in the table appended to this report as Exhibit A.

A summary of the transactions by months is given in the following table.[a]

[a] This table has been omitted, as it is included in report of the director of posts.

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At the present writing, September 3, the records show that deposits have been received to an amount slightly in excess of ₱1,000,000, and that of this amount approximately ₱600,000 remain on deposit.[a]

TELEGRAPHIC WITHDRAWALS.

During the fiscal year 103 telegraphic withdrawals were made at an average cost to the depositor of about ₱1.14 for each withdrawal. These withdrawals represent 5 per cent of the total number made. The amount so withdrawn was ₱10,678.39, or 3.8 per cent of the total.

POSTAL SAVINGS BANK STAMPS.

During the months of February and March, 1907, there were received from the Bureau of Printing and Engraving, Washington, D. C., the following amounts of postal savings bank stamps:

Denomination.	Amount.	Value.
Twenty-centavo stamps	507,540	₱101,508.00
Ten-centavo stamps	1,048,032	104,803.20
Five-centavo stamps	3,192,064	159,603.20
Total	4,747,636	365,914.40

These stamps are designed more especially for the use of the school children, and the fact that they were available only a few days before the close of the school year, April, accounts for the small number of stamps sold during the fiscal year.

A statement of the stamp transactions is given in the following table:

Statement of postal savings bank stamp transactions.

Month.	Sold.			Deposited.	Undeposited.
	Manila.	Provinces.	Total.		
1907.					
March	₱152.90		₱152.90	₱48.00	₱104.90
April	60.65	₱283.25	343.90	132.00	316.80
May	31.45	628.35	659.80	445.00	531.60
June	18.90	680.80	699.70	594.00	637.30
Total	263.90	1,592.40	1,856.30	1,219.00	637.30

CLASSIFICATION OF DEPOSITORS.

In order to arrive at a more accurate knowledge of the classes of people making use of the postal savings bank and of the business transacted by them, the following classification of depositors and their balances at the close of the fiscal year has been made.[b]

In connection with the above classification of depositors as to occupation it should be noted that the "professional" class includes, in addition to those usually so classified, those employees of the government whose duties are such as to throw them into this rather than into the "clerical" class. There are also included in this class a large number of Filipino teachers, who by virtue of their preparation would not properly be so classified, but who can not well be classed under any other head. The "student" class includes all students over the age of 15, those under this age being classified as children. Under

[a] A table showing deposits and withdrawals has been omitted, as it is also included in the report of the director of posts.

[b] Tables showing nationality, occupation, and conjugal condition of depositors have been omitted, as they appear in the report of the director of posts.

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"soldiers and sailors" are included all officers and enlisted men of the army, navy, and constabulary.

CLASSIFICATION OF DEPOSITORS' BALANCES.

In the following tables is given a classification of the depositors' balances. The first table represents a general classification without regard to nationality, while the second gives a classification according to nationality.[a]

INVESTMENT OF POSTAL SAVINGS BANK FUNDS.

The investment of the funds of the postal savings banks is, by the provisions of section No. 18 of act No. 1493, placed in the hands of an investment board, composed at present of the secretary of commerce and police, the secretary of finance and justice, the director of posts, the insular treasurer, and Mr. Barry Baldwin, a business man of Manila. On the recommendation of this board the following investment of postal savings bank funds in the form of time deposits bearing 3½ per cent interest had been made at the end of the fiscal year:

Bank.	Amount.
International Banking Corporation	₱170,000.00
Hongkong and Shanghai Banking Corporation	120,000.00
Chartered Bank of India, Australia, and China	130,000.00
Banco Español-Filipino	70,000.00
Total	490,000.00

All of the above banks are duly authorized depositaries of the Philippine government, and the deposits in them are amply protected by surety bonds filed with the Treasurer of the United States.

At the close of the fiscal year interest had accrued on the above deposits in the sum of ₱6,495.36, being in excess of the amount of interest paid to depositors by ₱2,893.84.

In order to provide a more lucrative field of investment for the funds of the bank, act No. 1493 was amended March 22, 1907, by act No. 1620. Under the provisions of this amendment loans may be made upon city real estate, under carefully guarded provisions, to the extent of 25 per cent of the total deposits of the bank, and upon improved agricultural land to the extent of 10 per cent of the total deposits. Provision was also made for investments in and loans upon any securities the principal or interest of which is guaranteed by the Government of the United States or of the Philippine Islands. On May 3 further provision was made by act No. 1640 for the loaning of the bank funds to the various provinces for public improvements under the guaranty of the insular government. Under the provisions of this act the province of Pangasinan has applied for a loan of ₱160,000 for six years, with interest at the rate of 5 per cent.

These provisions, widening the field of investment of postal savings bank funds, will enable the institution to reach a self-supporting basis much sooner than the original provisions would have allowed and at the same time will give ample protection to the bank.

GENERAL.

The statements contained in the foregoing pages concerning the operations of the postal savings bank for the fiscal year are so complete in their details as to require little in the way of explanation. There are, however, several points that seem to deserve special comment.

[a] These tables have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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GENERAL EXPENSES.

The total expenses of the bank for the fiscal year as given in the balance sheet under the item of loss and gain, page 416, are ₱37,393.35. If from this amount there be deducted the sum of ₱6,495.36, representing interest earned on the investment of the bank's funds, there remains the sum of ₱30,897.99, representing the real deficit for the fiscal year. A considerable part of this deficit is, however, more nominal than real, for, excluding from consideration that part of the supplies in the hands of postmasters which will not have to be duplicated for several years, there were on hand in the division of supplies, June 30, supplies to the estimated value of ₱10,000.

INDIVIDUAL DEPOSITORS' ACCOUNTS.

The classification of depositors' balances given on page 411 reveals the fact that about 58 per cent of the depositors with credit balances are Americans and 39 per cent Filipinos. It also appears that the 58 per cent American depositors held 86.6 per cent of the deposits, while the 39 per cent Filipino depositors held only 9 per cent. Herein lies the explanation of the unusually large size of the average deposit, ₱108.21, and average withdrawal, ₱143.25, shown in the table on page 411. In this connection it should be noted that the average size of the deposits fell, during the period under consideration, from ₱265.16, the average for October, 1906, to ₱77.85, the average for June, 1907. This is accounted for by the fact that the bank, during the first few months, gathered in the larger part of the surplus savings of the depositors, who were at that time very largely Americans. The deposits of the latter months represent more nearly the current savings of the depositors, among whom was an increasing number of Filipino depositors.

The large size of the average withdrawal, ₱143.25, is due to the fact that a large number of Americans deposit their savings in the bank only to draw them out in a lump sum on their return to the United States.

To the Americans scattered throughout the islands the bank has proved to be a great blessing, and while it is probable that about one in ten of the Americans in the islands are depositors, there is much to be desired in the extension of the work among our own people, who are, as a class, notably improvident.

The success of the postal savings bank, however, must ever be measured by the interest taken in it by the Filipino people. The records show that up to June 30, 944 accounts, representing 35.3 per cent of the total, had been opened by Filipinos. This is not a large number, but considering the fact that only a very small percentage of the Filipino people, and those mostly located in three large cities, have any conception whatever of the nature of a bank, and considering further the fact that it is exceedingly difficult to make such an institution known, much less understood, and that the cooperation of the schools in this matter is only at the present writing, September 3, beginning to be effective, it is believed that this represents a fairly good showing for six months' work, only a few banks having been opened before January 1, 1907.

EXTENSION OF THE BANK'S BUSINESS.

Under this head I desire to call attention to several means of furthering the use of the bank, especially by the Filipino people. The extent to which they will make use of the bank will, of course, be determined largely by the conditions under which they live as well as by the success attained in dispelling prejudice, overcoming custom, and making the institution known. To the great body of the people the government is at best but a hazy abstraction, the occasional concrete manifestation of which is more apt to inspire fear than confidence because of its restraining influence. It is no more than can be expected, under the circumstances, that the body of the people should look with suspicion upon the motives of the government in asking them to deposit their savings with its officials. It will take much time and patience to dispel this suspicion, and our hope of success rests largely upon what can be accomplished with the rising generation.

The conditions under which the Filipino people live must also be given careful consideration. For many years to come they will need to expend the larger part of their income in raising their standard of living. The pathway of civilization is paved with an ever increasing number of wants, and the implanting of new and higher ideals is a fundamental factor in the progress of any people.

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Nothing less will ever stir them out of their lethargy of primitive content. The schools and churches will ever be the most important factors in implanting new ideals. However, they are not alone in that work. The merchant who, by the tactful display of his goods, can cause new wants to arise is, as well, a powerful factor in stimulating that healthy discontent with present surroundings which will loosen the springs of effort, and while the prime motive behind commerce is financial gain, due credit should be given for the part it plays in carrying these concrete embodiments of civilization to the very doors of the humblest inhabitant of the globe, thereby awakening in him new desires and aspirations.

In view of these circumstances the line of action seems to be clearly marked out. Outside of the few favored ones who are blessed with a fixed purpose and endowed with sufficient energy to struggle for the attainment of the same, and who may be left out of consideration, the lesson to be taught by the savings bank is a proper discrimination in the valuation of the various commodities that enter into the daily life of the individual. The lower the scale of development, the more pressing are the wants of the moment. So true is this that the satisfaction of wants can at best be postponed for a short time. The stage of preparation for the "rainy day" or old age is still a long way off. Inasmuch as it is almost inevitable that there will remain no margin of income over expenditures, and it is well that it is so at this stage, attention should be directed to the necessity of turning expenditures from useless and unessential channels to those best calculated to contribute to permanent welfare, as, for instance, the curtailment of expenditures for sweetmeats and fancy articles of dress, with a view of purchasing, in the near future, something contributing to the upbuilding of the home. A man's expenditures will thus be gaged by a proper discrimination in values and come to be an expression of his noble rather than ignoble desires.

Under these conditions the savings bank for many years can hope to be but little more than a temporary depositary of the small savings of the common people, and its work will be classified very largely as educational. It is evident, therefore, that the most valuable means of furthering the use of the savings bank is the cooperation of the schools, which has been most cordially extended. For the economy of effort and the attainment of larger results, it is believed that this cooperation should be placed upon a more concrete and tangible basis. Steps have already been taken in this direction by the insertion of a large amount of illustrative material in a series of arithmetics now being published for the use of the schools. This should be extended as far as the nature of the work will allow to other text-books, in order that the teacher may have no excuse for neglecting this most important part of the child's education, as well as in order that, coming under the guise of illustrative material, it may not be considered as an additional burden. The work of teaching the child habits of thrift and foresight can be thus so woven into the work of the school that no pupil will leave its doors without having a full knowledge of the postal savings bank and a desire to make use of its privileges. The prizes offered to school children by the honorable commissioner of commerce and police are at the present writing yielding gratifying results in this direction, and I should like to see something of this kind made a permanent feature of the work. It is therefore recommended that an annual competition be provided for among the children of both public and private schools as follows. (1) That there be awarded to the pupil of each school division writing the best essay on "Thrift and foresight" an artistically designed certificate of merit bearing the great seal of the Philippine Islands and the signature of the governor-general and the secretary of commerce and police. (2) That a scholarship for one year in the Manila Trade School be awarded to such one of the above successful pupils being a boy as shall have been adjudged to have written the best essay on this subject, or a scholarship in the Manila Normal School under the same conditions if the successful pupil be a girl.

The benefits to be derived from the provisions of this contest, it is believed, would be ample compensation for the insignificant expense involved.

General publicity is another valuable manner of furthering the work of the postal savings bank. A beginning has been made in this respect by the publication in English and Spanish, for free distribution, of the rules and regulations of the bank in pamphlet form. A folder has also been printed in the most important dialects of the islands calling special attention to the value of prep-

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aration for the uncertainties of the future. In this connection the suggestion is made that it might be found desirable to secure the services of several thoroughly competent Filipinos, well versed in the native dialects, to go from place to place for the purpose of explaining to the common people the nature of the postal savings banks and encouraging their use. In this way a very large class of people could be reached whom it would be difficult, if not impossible, to reach in any other way.

In conclusion I desire to call attention to the desirability of providing a simple method by which employees of the government may allot any desired portion of their salary, either monthly or annually, to be deposited in the postal savings bank through the proper disbursing officer. It is believed that such a plan can be worked out so as to involve little extra work upon the disbursing officer. Such a provision has been recently introduced into the postal savings bank system in India with very satisfactory results. There is a question, however, as to whether this can be done without some legislation for the protection of the disbursing officer in the matter of the making of an allotment of salary by a government employee.

All of which is respectfully submitted.

BEN F. WRIGHT,
Chief Postal Savings Bank Division.

The SECRETARY OF COMMERCE AND POLICE.
(Through the Director of Posts.)

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EXHIBIT A.

Statement of postal savings bank business transacted according to offices during fiscal year 1906–7.

Office.	Class of bank.	Number accounts of opened.	Number accounts of closed.	Number accounts of open.	Number of withdrawals.	Average withdrawal.	Amount of withdrawals paid.	Number of deposits received.	Average size of deposit.	Amount of deposits received.	Stamp sales.
						Pesos.	*Pesos.*		*Pesos.*	*Pesos.*	*Pesos.*
Alaminos, Pangasinan	3	1		1				2	2.00	4.00	6.00
Alcala, Cagayan	2	4		4				6	3.18	19.00	.35
Angeles, Pampanga	2	8		8	1	50.00	50.00	32	23.61	755.70	3.65
Aparri, Cagayan	2	16	1	15	2	68.54	137.09	27	32.55	878.94	1.75
Aroyroy, Sorsogon	3	6		6				7	7.00	49.00	49.70
Atimonan, Tayabas	2	3		3				4	50.75	203.00	
Bacolod, Negros Occidental	2	16	2	14	1	3.01	3.01	29	27.75	805.00	
Bacoor, Cavite	3	1		1				1	6.00	6.00	6.00
Baguio, Benguet	2	18	3	15	5	115.33	576.67	40	60.67	2,427.00	.70
Bais, Negros Oriental	3	5		5				10	7.40	74.00	76.05
Balanga, Bataan	2	3		3				10	55.10	551.00	5.25
Baliuag, Bulacan	2	3		3				3	35.00	105.00	
Bangued, Ilocos Sur	2	3		3				3	1.00	3.00	.80
Batangas, Batangas	2	61	9	52	16	99.14	1,586.37	142	31.46	4,468.00	54.05
Bay, Laguna	3	9		9				18	1.22	22.00	25.55
Bayambang, Pangasinan	3	1		1	1	70.54	70.54	1	1.00	1.00	.35
Baybay, Leyte	2	4		4				5	1.40	7.00	1.90
Bayombong, Nueva Vizcaya	2	2		2				6	87.50	525.00	
Biñan, Laguna	3				1	30.00	30.00				
Boac, Tayabas	2	5	1	4				12	19.81	237.75	
Bolinao, Pangasinan	3										2.00
Bulacan, Bulacan	3	10		10	1	3.00	3.00	31	1.42	44.00	51.45
Cabagan Nuevo, Isabela	3							3	16.66	50.00	75.40
Cabantuan, Nueva Ecija	3				1	10.00	10.00				
Cagayan, Misamis	2	5	1	4	1	400.42	400.42	5	124.80	624.00	
Calamba, Laguna	2	14	4	10	10	214.99	2,149.93	71	54.87	3,896.00	33.45
Calapan, Mindoro	2	6	1	5				28	81.64	2,286.00	1.15
Calasiao, Pangasinan	3	5		5				9	7.44	67.00	67.00
Calbayog, Samar	2	18	1	17	3	145.33	436.00	40	60.25	2,410.00	
Calivo, Capiz	2	2		2				2	2.00	2.00	1.55
Calumpit, Bulacan	3	2		2				3	6.66	20.00	20.00
Camalig, Albay	3	7		7				7	1.00	7.00	7.00
Camiling, Tarlac	3	1		1				1	3.00	3.00	3.20
Camp Jossman, Iloilo	2	8	1	7	1	80.00	80.00	20	67.75	1,355.00	
Camp Keithley, Moro	2	3		3				3	86.66	260.00	
Camp Overton, Moro	1	88	20	68	30	104.76	3,142.87	262	600.41	15,731.00	
Camp Stotsenburg, Pampanga	2	53	2	51	24	35.62	855.07	112	50.78	5,687.00	
Capas, Tarlac	3	5		5				10	4.30	43.00	43.00
Capiz, Capiz	2	11		11				61	25.80	1,573.70	.10

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Carigara, Leyte	3	5		5				7	2.00	14.00	14.00
Catbalogan, Samar	2	3		3				12	52.20	626.50	26.50
Cavite, Cavite	1	157	27	190	120	168.49	20,218.82	698	81.17	56,657.67	3.20
Cebu, Cebu	1	29	1	28	9	163.33	1,470.00	87	12.19	10,535.60	10.65
Cervantes, Lepanto-Bontoc	2	3		3	1	200.00	200.00	8	30.25	242.00	2.90
Corregidor, Cavite	2	33	3	30	5	27.03	135.15	75	31.82	2,386.50	12.40
Cotabato, Moro	2	9	1	8	1	100.00	100.00	43	72.79	3,130.00	2.45
Currimao, Ilocos Norte	3	1		1				5	16.60	83.00	83.00
Cuyapo, Nueva Ecija	3	3		3				3	3.00	9.00	9.50
Dagupan, Pangasinan	2	12	4	8	5	129.92	649.61	47	87.87	4,130.00	
Davao, Moro	2	4		4				8	33.75	270.00	10.70
Dinalupijan, Bataan	2	4		4				9	26.11	235.00	160.00
Donsol, Sorsogon	3										3.00
Dumaguete, Negros Oriental	2	9		9				31	92.90	2,880.00	
Echague, Isabela	2	4		4				8	38.37	307.00	
Fort McKinley, Rizal	2	65	11	54	21	48.77	1,024.19	130	57.48	7,473.00	
Guagua, Pampanga	3	1		1				1	1.00	1.00	1.00
Guinayangan, Tayabas	3	4		4				5	3.20	16.00	16.00
Guinobatan, Albay	3										.05
Guiuan, Samar	3	3		3				5	9.40	47.00	47.00
Iba, Zambales	2	4		4				12	71.83	862.00	5.00
Ilagan, Isabela	2	16		16	1	100.00	100.00	63	68.39	4,309.00	.80
Iligan, Moro	2	3	1	2				10	34.10	341.00	3.05
Iloilo, Iloilo	1	56	6	50	12	160.45	1,925.48	138	166.13	22,927.00	10.20
Imus, Cavite	3	4		4				10	1.20	12.00	13.75
Janiuay, Iloilo	3	2		2				4	2.00	8.00	8.00
Jolo, Moro	2	39	7	32	11	89.49	984.47	109	56.79	6,190.50	
La Carlota, Negros Occidental	2	1		1				4	6.25	25.00	5.00
Laoag, Ilocos Norte	2	15		15	1	100.00	100.00	46	44.17	2,032.00	5.00
Legaspi, Albay	2	18	2	16	4	288.43	1,153.73	82	64.97	5,328.00	.75
Ligao, Albay	2	2		2				6	100.00	600.00	
Lingayen, Pangasinan	2	9	1	8				45	77.35	3,481.00	.05
Lipa, Batangas	3	13		13				15	1.66	25.00	26.50
Los Baños, Laguna	2	5		5	3	65.00	195.00	8	18.56	148.50	19.30
Lucena, Tayabas	2	14	2	12	3	49.00	147.00	40	59.93	2,397.25	19.10
Malabang, Moro	2	6	3	3	4	90.39	361.57	21	74.27	1,560.00	
Malabon, Rizal	3				1	24.00	24.00				
Malasiqui, Pangasinan	3	7		7				9	1.44	13.00	13.90
Malitbog, Leyte	2	6		6				8	9.62	77.00	84.40
Malolos, Bulacan	2	8	1	7	1	5.00	5.00	15	31.53	473.00	9.10
Manila	1	1,250	172	1,078	1,558	150.06	233,808.82	3,191	164.73	525,645.06	263.90
Maribojoc, Bohol	3	9		9							
Mariveles, Bataan	2	1		1				1	5.00	5.00	
Masbate, Sorsogon	2	11	2	9	2	40.00	80.00	17	34.64	589.00	.30
Mauban, Tayabas	3	2		2				2	3.00	6.00	6.30
Mexico, Pampanga	3	1		1				1	1.00	1.00	1.00
Moncada, Tarlac	3	1		1				3	3.16	9.50	.60
Nueva Caceres, Ambos Camarines	2	17	1	16				50	60.80	3,040.00	
Olongapo, Zambales	1	99	25	74	40	55.04	2,201.75	246	56.76	13,963.12	
Orani, Bataan	3	7		7				13	9.61	125.00	125.00
Orion, Bataan	3	1		1				1	20.00	20.00	20.00

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Statement of postal savings bank business transacted according to offices during fiscal year 1960–7—Continued.

Office.	Class of bank.	Number of accounts opened.	Number of accounts closed.	Number of accounts open.	Number of withdrawals.	Average withdrawal.	Amount of withdrawals paid.	Number of deposits received.	Average size of deposit.	Amount of deposits received.	Stamp sales.
						Pesos.	*Pesos.*		*Pesos.*	*Pesos.*	*Pesos.*
Ormoc, Leyte	2	7	2	5	4	137.50	550.00	24	10.39	2,494.00	1.50
Oroquieta, Misamis	2				1	10.00	10.00				
Pagsanjan, Laguna	2	1		1				1	60.00	60.00	
Palo, Leyte	3	1		1				1	1.00	1.00	1.00
Parang, Moro	2	8	2	6				20	81.75	1,635.00	
Pasacao, Ambos Camarines	3										.90
Peñaranda, Nueva Ecija	3	9		9	1	25.00	25.00	15	1.60	24.00	26.15
Pontevedra, Negros Occidental	3	1		1	1	2.00	2.00	1	10.00	10.00	10.00
Quingua, Bulacan	3	8		8				8	1.12	9.00	10.30
Romblon, Capiz	2	1		1				6	100.00	600.00	
San Carlos, Negros Occidental	3	6		6				20	2.75	55.00	5.00
San Carlos, Pangasinan	2	1		1	1	30.00	30.00	9	7.88	71.00	76.00
San Fernando, Union	1	34	3	31	6	51.66	310.00	113	64.46	7,285.00	4.00
San Fernando, Pampanga	2	9	1	8	1	201.25	201.25	17	32.46	551.90	5.70
San Isidro, Nueva Ecija	2	5		5				10	32.96	329.64	.10
San Jose, Ambos Camarines	3	2		2				2	1.00	2.00	1.00
San Jose, Antique	2	11		11	3	81.66	245.00	40	78.93	3,157.30	
San Miguel, Bulacan	3	3		3				3	3.00	9.00	9.00
San Narciso, Zambales	3							1	20.00	20.00	20.00
San Pablo, Laguna	3	11		11				13	3.23	42.00	42.20
Santa Cruz, Laguna	2	6		6	1	75.00	75.00	12	57.70	692.50	2.95
Silay, Negros Occidental	3	2	2		1	2.00	2.00	6	1.00	6.00	2.60
Sorsogon, Sorsogon	2	23	2	21	2	358.98	717.96	67	40.18	2,692.00	14.50
Sual, Pangasinan	3	2		2				2	1.50	3.00	3.00
Surigao, Surigao	2	4	1	3	1	10.05	10.05	7	5.00	35.00	
Tacloban, Leyte	1	47	6	41	12	73.61	883.37	209	68.37	14,290.00	5.90
Tagbilaran, Bohol	2	22		22	1	200.00	200.00	52	71.00	3,692.00	7.15
Tanauan, Leyte	3	5		5				7	1.00	7.00	7.00
Tarlac, Tarlac	2	1		1				4	57.50	230.00	1.40
Tubigon, Bohol	3										.60
Tuguegarao, Cagayan	2	9	1	8	1	40.00	40.00	28	64.68	1,811.00	
Valencia, Bohol	3	1		1				1	1.00	1.00	1.00
Vigan, Ilocos Sur	2	17	4	13	4	187.79	751.19	85	68.95	5,861.00	.10
Virac, Albay	2	2		2				2	62.50	125.00	
Zamboanga, Moro	1	34	7	27	16	126.92	2,030.83	93	130.04	12,094.00	.40
Total		2,676	347	2,329	1,958	143.25	280,499.21	7,267	108.21	786,361.08	1,856.30

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APPENDIX F.

REPORT OF THE DIRECTOR OF NAVIGATION.

DEPARTMENT OF COMMERCE AND POLICE,
BUREAU OF NAVIGATION,
Manila, P. I., July 1, 1907.

SIR: I have the honor to submit the following report for the fiscal year ended June 30, 1907:

ORGANIZATION.

On December 10, 1906, in accordance with the terms of act No. 1568 of the Philippine Commission, the bureau of port works ceased to exist as such and became a division of this bureau.

The bureau now consists of the division of vessels, interisland transportation office, light-house division, and the division of port works.

The assistant director of navigation, in the capacity of superintendent of interisland transportation, has a separate office on the water front near the old captain of the port's building, and there looks after the traffic carried by vessels of the bureau and supervises the service of the steamship companies under contract with the insular government. Divisional offices and the office of the director are on Engineer Island, at the mouth of the Pasig River.

FINANCES.

Division of vessels.—Act No. 1527 and subsequent resolutions of the Philippine Commission made available for expenses of the division of vessels and the offices of the director and assistant director of navigation the sum of ₱895,000. Of this, ₱500,000 was to come from the treasury and the balance from earnings. A total of ₱866,479.85 was expended. The balance, approximately ₱28,520, will be certified back to the treasury. Earnings for various classes of transportation were ₱450,295.48.

Light-house division.—Act No. 1527 provided ₱400,000 for the light-house division. Of this, ₱360,727.41 was expended for current maintenance work, and ₱39,272.59 for the installation of new minor lights, etc. In addition, ₱35,449 was expended from permanent improvement funds for certain specified construction work authorized.

Division of port works.—Resolution passed January 11, 1907, provided ₱88,600 for the running expenses of this division. Of this sum, ₱81,052.83 was expended. The sum of ₱900,383.50 was also expended from funds which had been provided for the permanent improvement of Manila, Iloilo, and Cebu harbors, dredging the Cagayan River near Aparri, and harbor surveys at various points in the islands.

MARINE RAILWAY AND REPAIR SHOP FUND.

Starting with ₱25,000, provided by act No. 1416 as a permanent reimbursable appropriation, the marine-railway and repair-shop fund has been augmented by profits derived from surcharging 10 per cent, the actual cost of all labor and material entering into work done, and now amounts to some ₱48,000, clear of all liabilities. This sum of ₱48,000 is for replacing such parts of the marine railway as wear out through service and to replace any parts broken. It is also available for the purchase of new machinery for the shops and the repairing of the old machinery. At the present time we are very short of small lathes, and a number will be installed during the coming year. The work performed consists principally of docking and repairing vessels for this and other bureaus of the Philippine government, for the United States Army (Quartermaster Department), and the United States Navy. It also comprises a great variety of jobs in no way connected with marine work.

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In the near future large expenditures from this fund are contemplated, including an item of about ₱18,000 for the placing of a pile foundation and the building of a 100-ton marine railway for the docking of small vessels, the present 1,400-ton marine railway being inadequate to handle all the work promptly, and the expense of docking a small vessel on the large dock being out of proportion to what it should be.

DIVISION OF VESSELS.

As stated under "finances," the total expenditures of the division of vessels were ₱866,479.85. This covered salaries and wages, subsistence of ships' officers and crews, ordnance, coal, oil, other supplies for vessels, shops, storehouses and offices, cablegrams, postage and telegrams, printing and binding, hire of land transportation, maintenance of Engineer Island, purchase and construction of water craft, repair and improvement of vessels, travel on official business, pilotage, and other incidental expenses, and included expenses of the light-house tenders and all other water craft belonging to the bureau, except the dredges and scows of the division of port works.

On June 30, 1907, the fleet consisted of 15 cutters, 10 seagoing launches, 2 seagoing centerboard auxiliary ketches, 1 seagoing sloop, 4 gasoline launches, and 14 steam launches for river and harbor work. They were stationed as shown below:[a]

All vessels in commission are manned, supplied, and repaired by this division, except those loaned to the United States Coast and Geodetic Survey and those leased to the United States Army.

The *Kiely*, *Neddo*, *Harris*, and *Clark* (*Merlin*) were transferred from the bureau of constabulary in August, 1906. The *Walker* was purchased, partially constructed, for ₱3,000. The *Fisher* was purchased, partially constructed, for ₱5,900—she is now nearing completion. The *Manila* and *Oeste* were transferred from the bureau of port works. The *Seagull* (*Bongao*) and *Sanderling* (*Coron*) were transferred from the bureau of customs, overhauled and repaired, and put into commission.

The *Jolo* and *Diana*, having been condemned by a board of survey, were sold at auction for ₱2,250 and ₱875, respectively.

Of the vessels out of commission, it is believed that the *Picket*, *Philadelphia*, *Cabra*, *Ogden*, *Guy Howard*, and *Suerte* should be advertised for sale, they having outlived their usefulness and being a source of expense, without bringing any returns.

PROPERTY VALUATION.

1. Present value of fleet (estimated) is	₱1,847,965.12
2. Stores	206,490.27
3. Ordnance	114,878.01
4. Supplies and equipment on vessels	98,079.79
5. Spare parts of machinery	39,800.00
6. Tools and machinery in shops	151,974.40
7. Marine railway	201,563.22
8. Scows, lighters, etc	16,470.00
9. Hoisting engine, fire pump, etc	8,164.37
Total value, exclusive of grounds, buildings, and fixtures	2,685,385.18

In figuring the valuation of property covered by items 1, 6, 7, 8, and 9, 10 per cent has been written off from valuation last year for depreciation.

Seagoing vessels visited 4,370 ports, carried 14,915 passengers and 6,976 tons of freight, and steamed 290,000 miles. There was such a demand for their services that vessels were in port rarely except for necessary repairs. At the beginning of the year there were 11 cutters in operation, but this number was reduced to 8 during the first half of the fiscal year.

INTERISLAND TRANSPORTATION OFFICE.

The total earnings of vessels of the bureau were ₱450,295.48. The charges were made up of rentals and charters of cutters, launches, and lighters, and

[a] This list has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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transportation of passengers and freight. While it has been proper to take vessels off routes serving ports already given fair transportation facilities by commercial steamers, there is plenty of work left for the bureau to perform which will not conflict with the interests of the merchant marine, but will give the provinces connection with Manila and other ports, assuring them a market for their products and generally creating contentment. However, the regular routes now operated over by no means give such a volume of traffic, nor make such a showing of earnings by the bureau, as those routes from which our vessels were excluded when contracts were entered into between the Government and Ynchausti & Co., Manila Transportation and Shipping Company, Smith, Bell & Co., the Compañia Maritima, and the Compañia General de Tabacos de Filipinas. Entering into contracts with these steamship companies has resulted in giving a much better service than heretofore between the principal ports of the islands and the need of competition by government vessels has, therefore, been removed. On the other hand, placing government vessels on the less traveled routes over which merchant boats could not afford to operate leads to the agricultural development of new sections, and this development will eventually make the new sections of such importance that commercial vessels will find it profitable to go there after traffic, and thus benefit themselves and the producers. It is believed that much good has already resulted from the establishment of secondary routes and that there should be more of them. Route 3, which connects Manila with ports in Palawan Province, is the only primary route which has not been turned over to a commercial steamship company. A cutter continues operating over this route and pays a large percentage of the cost of its maintenance. The route, however, would not be profitable to a commercial line. It seems to be the consensus of opinion that as a result of the government entering into contracts with private steamship companies and giving them its traffic—in consideration of improvement of the merchant service and maintenance of uniform and more reasonable rates—the service of the principal steamship companies throughout the islands has greatly improved. Passenger and freight accommodations are better, there is a known frequency of service, and discrimination between shippers has been prevented. Not only does the public seem satisfied with the changes effected, but the steamship companies themselves are pleased and their earnings are evidently satisfactory. Regular sailings, efficient service, and fair and uniform rates must result in accomplishing much good for the islands.

The sum of ₱3,000 is being expended to repair the building known as the captain of the port's, that it may be leased to a concern known as the Union Ticket and Information Company. Much benefit is expected from this.

LIGHT-HOUSE DIVISION.

When the Philippine Islands were taken over by the United States Government there were in existence 34 lights of all classes, 27 of which were in condition for operation. There are now 117 lights in operation, as follows:

Flashing lights	28
Occulting lights	9
Fixed lights	3
Port lights	28
Lens lanterns	47
Electric-arc lights	2
Total	117

In addition to the lights, there are now 109 buoys and beacons as compared with 31 in 1898.

Of the above, 16 lights were installed, 19 buoys laid, and 6 beacons erected during the past fiscal year. During the same period 4 lights and 1 buoy were discontinued.

Among the lights installed during the year were: Third-order flashing white light at Cape Bolinao; sixth-order light at Apo Island; sixth-order port lights at Mataja Island, Sialat Point, Ungay Point, Nogas Island, Ocata Island, Ambolon Island, and Batag Island—the latter to be used only during time of construction of new third-order light station there.

At the beginning of the year there was practically no money available for the construction of lights in accordance with the permanent improvement scheme, but on January 11, 1907, the Commission authorized the construction

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of a third-order light on Batag Island, northeast coast of Samar, at a cost of ₱85,000, and provided ₱15,000 to be expended in the construction of minor light stations at San Miguel Island, Isabel Island, and Punta Pata.

Batag work is already well under way. Barbier, Benard & Turenne (Paris) apparatus has been contracted for, and it is expected that the light will be in operation by January, 1908. This light is of great importance, as it will mark the entrance of one of the most traveled waterways in the archipelago and be visible 26 miles. It will be invaluable to vessels coming from Australia, army transports from the United States, and all other vessels passing through San Bernadino Straits en route to Manila or other Philippine ports.

Work at San Miguel Island is also under way, and it is expected that this station will be completed in October, 1907.

Construction of the lights on Isabel Island and at Punta Pata will be commenced in the near future.

When the third-order light on Batag Island and the lights on San Miguel and Isabel islands are in operation a vessel "picking up" Batag light 26 miles at sea and passing through San Bernadino Strait will not lose sight of a light during the passage to Manila.

The small machine shop of this division has done much valuable work repairing delicate light-house apparatus, constructing clockwork for occulting and flashing lights, etc. It is specially fitted for the manufacture and repair of parts which would otherwise have to be purchased abroad at great expense. The work is done entirely by Filipinos, under the supervision of an American master mechanic.

PORT WORKS DIVISION.

The following work was done by the division during the year:

MANILA.

Dredging.—Under contract approved August 9, 1905, 532,883 cubic yards of material was dredged from the outer harbor and placed in the Luneta extension fill at a cost of ₱127,891.92. This completed the contract, under which a total of 1,904,627 cubic yards was dredged at a cost of ₱457,110.48.

Luneta extension.—Under contract approved August 9, 1905, 209 linear feet of timber bulkhead was accepted, the cost being ₱4,180. Total length of bulkhead built was 4,409 feet at a cost of ₱88,180. Riprap to the amount of 4,383 tons (2,240 pounds) was placed in the Luneta extension revetment at a cost of ₱11,395.80. Total quantity of riprap placed was 79,730 tons, at a cost of ₱207,298. This contract was closed June 3, 1907.

Luneta extension, repairs to break of May 1, 1906.—Under contract approved May 25, 1906, 947 tons of riprap were placed in the break of May 1, 1906, at a cost of ₱2,462.20. Contract was closed June 3, 1907. Total quantity of riprap placed was 4,412 tons, at a cost of ₱11,471.20. Extra work to the value of ₱2,079.91 was done on the break of May 1, 1906. This completed these repairs.

Luneta extension, repairs to break of May 18, 1906.—Under contract approved May 25, 1906, 3,974 tons (2,240 pounds) of riprap were placed in the break of May 18, 1906, at a cost of ₱10,332.40. Extra work to the value of ₱10,768.58 was done in repairing this break. The government furnished sauale to the value of ₱1,339.80. The contractors have not been paid for this work, as the question of responsibility is to be made the basis of a suit.

Luneta extension, repairs to break of February 17, 1907.—Under contract approved March 9, 1907, 536 tons (2,240 pounds) of riprap were placed in this break, at a cost of ₱1,232.80; also 607 tons (2,240 pounds) of quarry dirt, at a cost of ₱1,335.40, and 3,715 feet B. M., of Oregon pine timber, used in repairing the sheet piling at the site of this break, at a cost of ₱371.50. Extra work to the value of ₱78.40 was done on this break.

Luneta extension, repairs to break of April 19, 1907.—Under resolutions of February 15 and April 30, 1907, extra work to the value of ₱53.75 was done in repairing this break.

Luneta extension, repairs to break of April 20, 1907.—Under resolutions of February 15 and April 30, 1907, extra work to the value of ₱187.47 was done in repairing this break.

Luneta extension, repairs to break of April 14, 1907.—Under resolutions of February 15 and April 30, 1907, extra work to the value of ₱12.31 was done in repairing this break.

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Luneta extension, reenforcing superstructure.—Under resolutions of February 15 and April 30, 1907, extra work to the value of ₱94.46 was done in reenforcing superstructure to prevent further breaks.

East breakwater extension.—Under contract approved August 9, 1905, 1,244 tons (2,240 pounds) of riprap were placed in the east breakwater extension, completing the structure, at a cost of ₱3,234.40. Contract was closed May 17, 1907, the total quantity of rock being 23,188 tons, and total cost ₱60,288.80.

Dredging.—Under contract approved December 6, 1906, 442,505 cubic yards of material was dredged from the outer harbor and placed in the Luneta extension, at a cost of ₱106,201.20. Work was started in January, 1907, and was finished in June, 1907, completing the Luneta extension. Contract was closed June 4, 1907.

Wharf abutments.—Under contract approved January 12, 1907, 236 tons (2,240 pounds) of riprap were placed as a foundation for wharf abutment B, at a cost of ₱826, 122.94 cubic yards of concrete at a cost of ₱2,286.68, 1,610 pounds of reenforcing steel at a cost of ₱96.60, and 305 tons (2,240 pounds) of quarry dirt fill back of the concrete wall of the abutment at a cost of ₱671. This abutment failed by settling on May 13, 1907. Designs for new abutments are being prepared and will be submitted shortly.

Steel wharves.—Under authority contained in paragraph 88 of contract approved May 24, 1906, extra work to the value of ₱600.41 has been done in preparation for the inshore row of cylinders. This work was discontinued on May 14, 1907, after wharf abutment B had failed, as it is proposed to build a different style abutment, which will do away with the present necessity for any further extra work. About one-third of the steel for these wharves has been delivered. Sixty-eight cylinders for encasing piles have been completed at the contractors' shops, and six of these have been delivered. Pile driving was commenced on June 1 and piles for the first bent were completed June 6. These piles show greater supporting power than was expected and were very difficult to drive, the average penetration under the last blow of a 3,600-pound hammer falling 30 feet, being about 1 inch. Work of concreting these piles was suspended, owing to the fact that the piles had spread in driving so that the cylinders would not fit over them with the proper clearance between the piles and the inside edge of the cylinders.

Lower Pasig River.—Dredge *No. 1* was at work for nine months and removed 300,944 cubic yards of material from the river and bar at a cost of ₱0.152 per cubic yard. Dredge *No. 2* was at work for seven months and removed 293,641 cubic yards of material at a cost of ₱0.141 per cubic yard. The channel at the mouth of the river has been widened in order to permit ships to leave port without striking the bar as they make the turn outside the river.

Upper Pasig River.—Dredge *No. 3* was at work for three months on the Napindan bar and removed 36,875 cubic yards of material at a cost of ₱0.176 per cubic yard. Work with this dredge was stopped in September, 1906, and the dredge laid up. The hull was badly in need of repairs and the machinery was in poor condition. This machine was not originally designed as a dredge should be—the engine was but 20 horsepower, when 100 horsepower is required. A new design for this dredge has been made and the plans are nearly complete. Dredge *No. 7* was at work at San Felipe Neri for four months and removed 13,340 cubic yards of material at a cost of ₱0.836 per cubic yard. The work of this dredge is hampered by the lack of dump scows, those on hand being insufficient to keep this dredge and dredges *1* and *2* working to their full capacity. A large part of the material from this dredge was used in making a fill back of the river wall at the Maestranza, and it therefore has value to offset the high price of the dredging. Dredge *No. 5*, working the river in rear of the post-office, removed 2,464 cubic yards of material at a cost of ₱1.073 per cubic yard. Material from this dredge was deposited back of the Maestranza wall.

The lower river is now in good condition and the plant available is able to keep it properly dredged.

The upper river contains numerous bars which, at low water, are serious obstacles to navigation.

CEBU.

At the beginning of the fiscal year 1907—during July and August, 1906—considerable delay was caused by heavy seas, making it impossible to deposit concrete with a floating derrick. The continual pounding of heavy seas caused a section of the bulkhead, in a mud deposit near the center of the basin structure, to drift inward. During September the typhoon signals were displayed about

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once a week, and on the 27th the heavy sea then running destroyed 264 linear feet of double bulkhead. The break occurred in the section that had been battered out of line during the storms of July and August, and it is probable that the continued battering of previous storms had weakened the structure. Only one block of concrete was placed during September. In October no work, except the removal of the wreckage from the bulkhead destroyed, was done until the 26th, when a few bulkhead piles were driven. A second concrete mixing plant was completed during this month. In November no work was attempted until the 13th, because of continued rough weather. A new foundation driver was completed during this month. During December very little work was done because of frequent breakdowns in the plant. No concreting had been done from September 21 to December 29. In January a fair amount of work was done, but considerable trouble was encountered in getting good gravel, and the screening was a source of constant trouble and delay. The buckets used in depositing concrete were faulty and a considerable loss of concrete was caused by misdumping. In February arrangements were made by the contractors to work night and day on the concreting. The gravel was improved by the addition of screened gravel purchased from the natives. During March the bulkhead on the basin section was completed, and the bulkhead driver was moved and started working on the extension of the bulkhead toward Smith Bell & Co.'s wharf. The bulkhead driving progressed very slowly because of a stratum of hard sand clay encountered at this point. A record of the various delays occuring in the work was kept this month, and the plant showed an efficiency of only 40 per cent. In April the foundation piling on the basin section was completed and the pile driver, which was in a dangerous position, was dismantled. The plant showed an efficiency of only 38 per cent, due mainly to the difficulty of getting men to work nights. The basin section of the wall was completed during the month of May. The dredge arrived May 11, but was unable to start work before the 30th, because a casting on one of the spud wells wast lost in towing from Iloilo. More work was accomplished this month than any month previous, and the efficiency of the plant increased 25 per cent, the percentage of efficiency being 46 per cent. The contractors drove a 4-inch pipe to a depth of 113 feet at the inner side of the wall at the Smith Bell & Co.'s wharf and obtained a flowing well of clear soft water, which is excellent for boilers. They have erected a small steam pump and force it into a distributing plant or tank, thence pipe it all over the work. During the month of June the work progressed at a fair rate of speed until the 23d, when a severe storm occurred, which broke the outer low-water bulkhead walling and drove inward 13 feet of sheet piling at a point near Smith Bell & Co.'s wharf. The entire bulkhead was swinging through an arc of 2 feet before this break occurred. The weather continued rough until the 26th, when repairs were commenced. During this storm the dredge broke a spud and was laid up until the close of the month. Efficiency for this month was 44 per cent. A series of borings were taken over an arc east of the government wharf to determine the proper location for an extension of the quay wall. The amount of work completed up to the end of the fiscal year 1907 was as follows:

Outshore bulkhead (not to be paid for).—12,511.2 linear feet of bulkhead piling and 174,126 feet B. M. of sheet piling had been driven and 16,110 feet B. M. of walling had been placed. This work completed 1,607 linear feet of double bulkhead.

Foundation piling.—Of foundation piles 70,024 linear feet had been driven, covering 1,537.7 linear feet of wall.

Concrete wall.—Of concrete 4,054.7 cubic yards had been placed in the superstructure, covering 1,392 linear feet of wall, and 15,245.2 cubic yards had been placed in 117 blocks of the substructure, covering 1,423.4 linear feet of wall. Of cement 20,547¼ barrels had been used on the work and 130¼ wasted by losing batches overboard. Of concrete 138.9 cubic yards had been deducted for misdumping.

Dredging.—Of material 41,842.5 cubic yards was dredged and placed in rear of bulkhead wall.

A detailed statement of the work done, the amount earned by the contractors, and the quantity and value of cement used is given in Table I.[a]

At the close of the fiscal year the wall was completed from its western extremity as far as the Smith-Bell wharf, with the bulkhead and foundation

[a] This table has been omitted and is on file in the Bureau of Insular Affairs, War Department.

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piles extending a little beyond that point. The fill had been partly completed back of the basin section of the wall.

The original time set for the completion of the contract was February 1, 1906, which was extended in June, 1904, to September 1, 1906. In August, 1906, the time was further extended to September 1, 1907. It is not at all probable that the work will be completed at the time now set.

ILOILO.

The dredging was completed, 295,549 cubic yards of material having been dredged during the year, and extra work to the amount of ₱325.66 done. The contract was completed on March 11, 1907, the amounts of the various items being as follows: 24,980 linear feet of piling, 2,747 cords of fascines, 34,925.5 tons of stone, 476,049 cubic yards of dredging, and ₱1,714.73 worth of extra work.

The material dredged was very heavy—consisting of sand and gravel, with occasional pockets of mud. Obstructions were frequently encountered, causing breakdowns and delays. The material dredged was placed behind dike X, south bank dike, and the dike on the military reservation.

	Cubic yards.
Total amount of material dredged	645,317
Total amount of material paid for	476,049
Total amount of material dredged in excess	169,268

Extensions of time under this contract were granted as follows: November 1, 1905, to May 1, 1906; May 1, 1906, to November 1, 1906; November 1, 1906, to March 1, 1907.

The work was completed on March 11, 1907, without application for extension of time to cover the last ten days. The expenses of inspection and superintendence were charged against the contractor for the period from May 1, 1906, to March 11, 1907. In addition he was charged a penalty of $3 per day, in accordance with the contract, for the period from March 1 to 11, 1907.

Additional work was authorized at Iloilo May 17, 1907, by act No. 1650, which appropriated the sum of ₱170,000 to be used in repairing the present river wall, constructing not less than 300 feet of new wall, and dredging an extension of the present channel and a turning basin in the Iloilo River. This item of dredging is contingent upon the subscription by private parties of ₱25,000 for the same purpose. A party is now engaged in making the necessary investigations and estimates for the proposed work. It is understood that efforts are being made to raise the ₱25,000 by private subscription, but thus far no notice has been received of its having been deposited with the insular treasury as required by the act.

IMPROVEMENT OF CAGAYAN RIVER.

The Commission, on March 27, 1907, authorized the sending of a dredge to the Cagayan River, province of Cagayan, Luzon, to be operated in the improvement of the river under an arrangement with the Compañia General de Tabacos de Filipinas, whereby the government pays for the superintendence of the work and the supplies for the dredge and the company furnishes the labor, and moves the dredge from place to place.

One of the Priestman dredges was equipped for the work and, after repeated efforts, was finally towed to Aparri, reaching there May 15, 1907. Owing to parts lost on the trip and breakage of machinery, no dredging was done before the close of the fiscal year. The time was employed removing snags from the river and in improving the condition of the dredge.

INVESTIGATIONS AND SURVEYS OF RIVERS AND HARBORS.

The survey of Tagbilaran, Bohol, in progress at the beginning of the fiscal year, was completed, and surveys were made at Loay River, Bohol, at Calbayog and Laoang, Samar, and at Lucena, Tayabas. Some further investigation was made at San Fernando, Union, to obtain information in addition to that developed by a former survey.

Reports were submitted covering the surveys of Tagbilaran, Port Batan, Capiz, Escalante, Danao River, and of Abulug Canal and Cagayan River.

Preliminary examinations were made of Calbayog, Legaspi, Port Sula, Coal Harbor, Tabaco, Jimamaylan, San Juan de Ilog, San Jose de Buenavista,

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Tacloban, Pasacao, Guinayangan, Talcauayan Bay, Ragay Bay, Bantuan Point, Port Pusgo, Pagbilao, Laguimanoc, Lucena, Batangas, and Dagupan.

At the close of the year two parties were in the field—one at Laguimanoc, Tayabas, and the other en route from Laoang, Samar, to Jimamaylan, Negros.

PASIG RIVER INVESTIGATIONS.

By resolution adopted August 22, 1906, the Commission allowed ₱5,000 for investigations in regard to the improvement of the port of Manila and other harbors. Under this authority an investigation has been made to determine the probable cost of carrying out certain recommendations of a commercial committee on the use of the Pasig River and its walls. The specific questions to be determined are:

1. The cost of the erection of a modern steel bridge across the Pasig River in line with Calle Rosario, and of the removal of the bridge of Spain.
2. The cost of a bridge for the discharge of cattle from ships at a point on the river near the Vitas bridge.
3. The cost of the extension of the present river wall from the Maestranza to the river wall at the moat just beyond Fort Santiago, and of the fill thereby rendered necessary.
4. The cost of changing the present river lines between the bridge of Spain and the Santa Cruz bridge to conform to the recommendations of the committee.

Borings have been made on the sites of the proposed Rosario bridge and river walls. Estimates have been made of the cost of most of the work involved. The absence on leave of the engineer assigned to this work, and his subsequent resignation, has delayed the completion of the work outlined.

Résumé of financial statement.

Expenditures during fiscal year 1907:	
Improvement of the port of Manila	₱423,753.16
Improvement of the port of Cebu	289,919.05
Improvement of the port of Iloilo	224,396.15
Harbor surveys, ports of Philippine Islands	17,778.37
Surveys and investigations, Pasig River	3,597.09
Repairs to post-office dock, Manila	975.64
Dredging Cagayan River, Luzon	1,016.07
Total expenditures fiscal year 1907	961,436.33

The above ₱961,436.33 represents payments actually made. Liabilities exist aggregating ₱20,000, making the total expense of the division ₱981,436.33.[a]

IN CONCLUSION.

Division of vessels.—In view of the importance of developing traffic on secondary routes, special attention will be paid to that feature. Several new routes are being considered, and several more launches will be put into commission in order to carry out the schedules arranged.

It is recommended that four or five of the old launches not in commission be sold, the proceeds to be used in purchasing a seagoing launch of the *Ranger* type and, if a sufficient balance remains, one boat for upriver use.

It is the intention to extend the upper decks of a few cutters, as has already been done on the *Polillo* and *Basilan*, and to refasten several of them. As many cutters will be improved in these respects as the appropriation for the fiscal year 1908 will admit of.

Batan (Albay Province) coal is being experimented with on several of the cutters. The results obtained have been more or less satisfactory, and its use may become quite general. Just now it is practicable to use it only on those vessels so stationed that they can take their supply direct from the mine. From numerous experiments carried on aboard vessels, it has been found that by using the ordinary grate bar the consumption of this coal is 60 per cent greater than when using Australian or Japanese coal. The grate bars have been changed on several cutters and the coal experimented with until this

[a] Tables showing these figures in detail have been omitted and are on file in the Bureau of Insular Affairs, War Department.

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excess has been reduced to 35 per cent. Possibly when coal is mined from the deep levels it will be found to approximate in quality the foreign coal referred to.

Light-house division.—Members of the light-house board are of the opinion that a large light should be constructed on an island east of Zamboanga for the purpose of aiding vessels passing through Zamboanga Strait, and plying between China, the Philippines, Australia, and Java.

Port works division.—Aside from continuing the work of improving the harbors at Manila, Iloilo, and Cebu, and other work already started, recommendations will be made that several small harbors in the islands be improved. It is thought that much effective work can be accomplished at small expense by making more accessible many ports to and from which a fair volume of traffic moves. Survey parties are doing considerable work toward selecting the ports which should be given preference, and in deciding the nature of the improvements it will be best to undertake, and, in addition, are surveying harbors with the view of selecting ports for railroad termini.

The demand for berthing space in the Pasig River, Manila, is such as to make it imperative that the river wall on the south side be extended at least as far upstream as the Bridge of Spain, and that the area behind the wall be filled in. Material for filling can be supplied by dredges working up the river.

The two steel wharves for Manila will be completed during the fiscal year 1908, and will give about 2,500 linear feet of docking space for foreign vessels, which will do much to relieve the congestion of traffic in the river, particularly as regards the handling of cargo in cascos. Wharf B will be 70 feet wide and 600 feet long, and wharf A 110 feet wide and 650 feet long. Wharf B is located 725 feet east and wharf A 1,500 feet east of the United States army transport dock. The wharves when completed will have cost in the neighborhood of ₱900,000. As soon as completed, the Manila Electric Railway Company contemplates running lines to both wharves, and cargo may be carried cheaply to all parts of the city. As a temporary convenience a small wharf will shortly be built at the end of the old fill, where ships' launches and boats may land their passengers near the Luneta.

Number of American and Filipino employees.—There were 1,365 officers and employees of the bureau on June 30, 1907. Of this number 109 were Americans, 1,204 Filipinos, and 52 Chinese. The Chinese are used as blacksmiths, boiler makers, and carpenters in the shops. For blacksmithing and boiler making there is little prospect of replacing the Chinese with native workmen. Filipino boys employed as apprentices in the machine shops take readily to that class of work and give promise of becoming efficient machinists. There is usually a force of from 150 to 250 men employed on the marine railway and in the shops.

Respectfully submitted.

FRANK P. HELM,
Director of Navigation.

The SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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APPENDIX G.

REPORT OF THE DIRECTOR OF COAST SURVEYS.

MANILA, P. I., *July 1, 1907.*

SIR: I have the honor to submit the following report of the work executed in this bureau during the fiscal year ended June 30, 1907.

FIELD WORK.

The operations of the various field parties during the fiscal year are briefly epitomized as follows:

WEST COAST OF LUZON.

The offshore hydrographic survey from Balingasay Point to Caiman Point, and from Guia Point to Capones Islands, was completed between December 1, 1906, and February 27, 1907, by the party on the steamer *Romblon*, and in connection with this work the topography in several places was strengthened and extended. This completes the general survey of the north and west coasts of Luzon, from Aparri Point to a short distance south of Laguimanoc Bay, with the exception of the hydrography from Aparri to Culili Point and that for a stretch of about 5 miles south of the Frailes Islands.

The gap in the general survey (triangulation, topography, and hydrography) between Talin Point and Cape Santiago was then undertaken by the *Romblon* and completed between March 4 and 30, 1907.

At the beginning of the fiscal year Assistant Ferguson with first the launch *Polee* and afterwards the *Erica* was engaged in the extension of the main Philippine triangulation to the southward between Luzon, Mindoro, and Marinduque. This scheme was completed to the line from Dumali Point, Mindoro, to Baltazar, one of the Tres Reyes Islands, and a base and azimuth measured at Calapan, Mindoro. On September 1 the party returned to Manila.

From October 8, 1906, to January 22, 1907, Assistant Ferguson was employed in strengthening and completing the central triangulation of Luzon between Dagupan and Caballo Island, at the entrance to Manila Bay, the work including a base measure near Lingayen.

VERDE ISLAND PASSAGE.

The gap in the hydrographic surveys between Verde Island and Mindoro was assigned to the *Marinduque*, which had to await the arrival of a new shaft from Hongkong and could only be employed in the meantime in sheltered waters. The work began on May 22 and after completion the party was employed until June 18 on a general topographic and hydrographic survey of the north coast of Mindoro west of Port Galera. After the date named the steamer returned to Manila for the installation of the new shaft.

PORT GUBAT AND PORT SULA.

The *Romblon*, when en route to the scene of main season's work, was directed to search for a reported danger in the entrance to Port Gubat. This was found, and an additional small piece of work undertaken was the filling in of the gap between the surveys of Assistants Derickson and Denson in Port Sula, a valuable refuge for the shipping using the port of Legaspi during the typhoon season. This work, involving additional hydrography and topography was successfully completed between May 13 and 17, 1907.

EAST COAST OF LUZON.

The general survey of the coast line from Maqueda Channel to San Miguel Bay, triangulation, topography, and hydrography, were being executed at the beginning of the fiscal year by the party on the steamer *Fathomer*, which left Manila on May 2, 1906, and returned thither November 1.

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The general survey, triangulation, topography, and hydrography westward of San Miguel Bay to Jesus Point and connection with the Calaguas Islands were completed by the party on the steamer *Romblon* in the period from May 22 to October 24.

The party on the steamer *Marinduque* was engaged from April 28 to November 3, 1906, in general surveys from Alabat Island to the east coast of Polillo Island.

The work of the three steamers herein referred to was carried on amid grave inconveniences and until the end of August the *Marinduque* had to make a round trip of about 420 miles and the *Romblon* one of 250 miles in going for coal and supplies, their base until then being Legaspi. The section in which the ships worked was most inadequately represented on all available charts, the coast line as shown being but little more than a result from a running survey. The water area was thickly interspersed with islands inaccurately shown, both in size and location. The available soundings were very few in number, and, as a climax, the summer and fall deserves an unusually evil reputation for the number of their cyclones. They began in May and lasted through September, making the position of the ships very hazardous on this dangerous coast, where the location of harbors of refuge was one of the first duties that had to be attended to.

The *Marinduque* experienced five typhoons in September—the number for the season, May to September, being 10. The typhoons, besides endangering the ships, caused serious delays by their destructive action on all classes of signals, trangulation and hydrographic—every storm necessitating the rebuilding of nearly all in use. The poverty of the people along this coast was also a cause of delay, as almost anything used for signals was precious in the eyes of these wretched people, and the chiefs of parties were unanimous in reporting the serious amount of time lost in replacing signals destroyed for the wire, tacks, or cloth used on them, no cutting or slashing of materials seeming to make them worthless where poverty was so supreme.

In addition to the wholesale change in the representation of the general coast line that was made in this season and the development of the Lamit typhoon anchorage, another notable result deserving of special mention was the survey of Hook Bay, a very excellent typhoon harbor of refuge in Polillo Island. Port Lampton and Burdeus Bay were especially developed at the instance of the honorable secretary of commerce and police, the latter offering a fine outlet for the large coal deposits reported to exist on Polillo Island.

The surveys of this season, among other changes, reduce the area of Polillo Island almost by half.

CATANDUANES ISLAND.

On the return voyage to Manila of the *Marinduque* the party was ordered to make an examination for a dangerous shoal reported off Cabugao, south coast of Catanduanes, with the result that the danger was located and fully developed.

On June 16, 1907, the steamer *Fathomer* left Manila for the north coast of Catanduanes Island, to take up the general surveys on the north and east coasts which remain to complete the work of charting in this section.

EAST COAST OF LUZON—WORK IN 1907.

On May 17 the *Romblon*, having established an automatic tide gauge at Mercedes for control of hydrographic observations, began operations in the vicinity of San Miguel Bay to connect the triangulation executed last season by the *Pathfinder* and *Romblon* and extended the general survey of the coast up San Miguel Bay. On completion of this work it will resume the work of last season in the vicinity of Jesus Point, extending it west and north.

NORTH COAST OF SAMAR.

A party with a chartered launch, first under the direction of Assistant Quillian, and later under Assistant Maupin, extended the general survey of the north coast triangulation, topography, and hydrography of Samar from Laoang to a junction, at the Balicuatro Islands, with the work executed by the *Pathfinder* in 1902.

NORTH AND EAST COASTS OF SAMAR.

The party on the *Pathfinder* began operations off Samar on May 8, 1906, and on November 17 closed operations in Matarinao Bay, the work embracing triangulation, topography, and hydrography.

The operations of our parties have now perfected the surveys of every harbor suitable for commerce or refuge on the north and east coasts of Samar,

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political and military reasons making this a desirability of the highest importance. The island was in a badly disturbed condition while the work was in progress, and it is a matter of sincere congratulation that our parties did not suffer any harm at the hands of the savage Pulahanes, for at one station within sight of an observing party troops were landed to clear the enemy from the near vicinity. At the mouth of the Suribao River one of our parties met with a sad accident in the overturning of a whaleboat, which resulted in the death of one of our seamen, the remainder of the party actually owing their lives to the admirable conduct of the natives living near where the accident occurred, who rushed to their aid and at the imminent risk of their own lives dashed in and dragged the helpless crew ashore. The officer in charge was insensible when rescued. The bravery of the natives was splendidly supplemented by the generosity of the military authorities, who, as soon as notified, sent a detachment of scouts to bring in the destitute party and then supplied every comfort and assistance that was necessary for the men.

GUIMARAS STRAITS, EAST COAST OF PANAY, AND NORTH COAST OF NEGROS.

The general survey in this vicinity was carried on by the party on the *Research* throughout the year, except during two weeks in July, 1906, and about three weeks in February and March, when the vessel was being overhauled and undergoing repairs.

On July, 15, 1906, the general survey north of the line from Tomonton Point, Negros, to Banate, Panay, was taken up and carried as far north as Ragalumbi Island.

Early in May the triangulation had been executed north to a connection with the Zapotes Islands and Jintotolo light and eastward to the Don Islands. The party then took up the hydrography and topography in vicinity of Cadiz Nuevo, working eastward along the north coast of Negros.

SOUTH AND WEST COASTS OF PANAY.

The hydrography off these shores, from Oton to San José de Buenavista, was completed by a party under Assistant Latham, operating with a chartered launch. Operations began January 15 and terminated on May 27, the triangulation and topography having been executed last year.

WEST COAST OF PANAY.

Assistant Maupin, with a shore party, starting at the north end of the Panay shore work, on the west coast, extended the triangulation through to the north coast of the island, and the topography was simultaneously carried to the Bugan River. The field operations of this party began on January 7 and closed on May 27.

WEST COAST OF LEYTE.

The party on the steamer *Marinduque* on December 13 proceeded to Ormoc, Leyte, to take up the survey between Leyte and Cebu, a continuation of that done in this vicinity in the last fiscal year. The previous work comprised mainly some triangulation and topography and a small zone of inshore hydrography. This season an azimuth was measured and the triangulation was strengthened and expanded from Bulalaqui Point (the most northern point of Cebu Island) to Limasaua Island, south of Leyte, and the offshore hydrography developed westward of the Camotes. The season extended from December 16 to April 21.

NORTH COAST OF MINDANAO.

The extension westward of the general survey of the shore line and water area of Iligan Bay was carried on by a party under Assistant Latham, with a chartered launch. The work was taken up on July 1 and continued until December 1.

The survey connects our previous work about Iligan with Polo Point, and one leading feature secured was the location and charting of the very dangerous Iligan reef. The work will be very important in the development of a country which possesses very great natural resources.

SOUTH COAST OF MINDANAO.

The remarkable growth of the importance of the country in the vicinity of Zamboanga and the wonderful improvement in the commerce of this port were convincing reasons for taking up the survey of southern Mindanao, from the astronomical station as an initial point particularly, as it promised to enable

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us to settle definitely and promptly the disputed point about the existence of certain dangers to navigation in the Basilan Strait, which were a cause of grave concern to the masters of large vessels using this passage. The party on the steamer *Fathomer* began operations on December 10 and closed on May 2, having carried the combined survey operations to Buluan Island.

SOUTH COAST OF MINDANAO, GULF OF DAVAO.

The enterprise of the American settlers, who have done so much to attract attention to the possibilities for hemp and cocoanut raising about the shore of this gulf, made it very important to insure good charts for this area, as there is no locality in the southern section of the archipelago, except the country about Zamboanga, which is at present attracting so much notice and attention. Accordingly on the return of the *Pathfinder* from her trip to Hongkong for repairs she was at once dispatched to Davao to take up the ends of last season's operations and extend the survey. The progress made this season was so satisfactory that it is evident another similar one should bring the work in this gulf to a conclusion.

To arrange for improvements in the representation of the entrances to the Gulf of Davao and the connection with our surveys, now terminating near Quidapil Point, astronomical determinations have been made at Pola and Tinaca points and Cape San Agustin. Running surveys have also been made in several of the trips made to Caldera Bay for coal which will give a considerable addition of strength to our representation of the coast from Malalag Bay to Quidapil Point, which for the present has to be taken from Spanish charts that are evidently not based on work of much exactness.

TIDAL AND MAGNETIC OBSERVATIONS.

Elaborate series of tidal observations form part of the programme of all the hydrographic parties, and in addition, two self-registering tide gauges have been maintained throughout the year at Manila and Iloilo. In conjunction with the insular bureau of navigation, division of port works, we operate the self-registering gauge at Cebu and receive its records.

Regular magnetic operations form part of the plan of work for the four large steamers, and the reception of a new standard set of magnetic instruments has been taken advantage of to plan a systematic use of them in different sections where the vessels operate.

THE SURVEY STEAMERS.

The *Pathfinder* has been steadily at work except from December 1 to February 8, during which she was sent to Hongkong for the installation of new masts, and from June 15 to the end of the fiscal year, when she was in Manila for docking, painting, minor repairs and outfitting for her next field season.

The steamer *Research* was only absent from the working grounds five weeks, the time required for two semiannual overhaulings and repairs.

The steamer *Fathomer* was in Manila from October 24 to December 5, and from May 9 to June 15. This steamer has not required any extensive repairs and has proved most satisfactory as a working vessel.

The steamer *Romblon* was in Manila from October 27 to December 6, and from March 30 to May 10, repairing and outfitting.

The steamer *Marinduque* returned to Manila on November 3, and, after repairing and outfitting, sailed for the work between Leyte and Cebu on December 12. She returned to Manila on April 21, and the list of repairs was a very moderate one, but on examination of her starboard shaft it was found in such a condition that the inspector pronounced her unfit for work in any but sheltered waters. When the steamer was in for repairs in last December one of the requirements was an examination of the shafts, and the inspector then, after declaring her in A 1 condition, pronounced her "fit for any service." The port shaft is unimpaired and while she was waiting the arrival of a new shaft from Hongkong the steamer has been assigned work off the north coast of Mindoro. The vessel, after making all repairs but those on the shaft, sailed for the working grounds on May 22, returned to Manila on June 18, and has since been in Manila having the new shaft fitted and installed.[a]

[a] A large amount of detailed information has been omitted as to field force and work accomplished and is on file in the Bureau of Insular Affairs, War Department.

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The records for the last three years—one of which was the year before the Coast and Geodetic Survey fleet was increased by the addition of the two coast-guard boats, in another these vessels were available for the last half of the year only, and the last being the year for which this report is made—show a very satisfactory increase in the corresponding statistics for this augmentation in our force, as indicated by the following table:

Comparative statistics of field work in the past three years.

	1905.	1906.	1907.
Hydrography:			
Area developed, square statute miles	2,498	2,337	6,405
General coast line, statute miles	307	419	783
Number of soundings	195,604	295,853	404,653
Topography:			
General coast line, statute miles	257	443	873
Detailed coast line, statute miles	494	626	1,495
Triangulation:			
Progress in statute miles	187	647	797
Points determined	409	776	646
Points occupied	126	343	344
Tide stations	17	27	43
Magnetic stations	3	----------	25

Comparing the equipment of the survey in the three years contrasted, the proportion of strength should be in the respective ratios 3½, 5, and 6. The only items in which 1907 falls below what should be its showing, in comparison with either of the other years, are the quantities under the heading triangulation for "points occupied" and "determined," this being due to the fact that, except for one month, the party organized specially for triangulation was employed in areas which had already appeared in our tables of statistics.

The large sum total of the area of hydrography developed for this fiscal year is due to the fact that the steamers in Verde Island Passage, Sibuguey Bay, the section between Leyte and Cebu, in the Gulf of Davao, and in the offshore hydrography off the coast of Zambales developed a large area where the depth of water did not make it necessary to run the close lines and take soundings as frequently as is the case where shoaler waters prevail; but although the sum total of the number of soundings should then be less, as soundings in deep water take so much more time for each cast than where the waters are comparatively shoal, the figures for this item, instead of any diminution, show an increase. They are 107 per cent over the returns for 1904–5 and 40 per cent above those for 1905–6, as against 43 per cent and 20 per cent due to difference in organization and equipment.

The final results for output of completed coast line, on the basis of one line of general progress for each mile of general coast hydrography and general coast topography, based on triangulation, are 358, 431, and 828 statute miles, respectively, for the past three years, the sum total now completed being 2,474 statute miles, or 21.5 per cent of the total general coast line of the Philippines. Adding to the foregoing the 1,254 miles of Spanish and British surveys, which are considered sufficient for the present needs of commerce, the total coast line charted sufficiently well for immediate demands is 32 per cent. The work of the past year equaled 8.4 per cent of the total remaining to be done on July 1, 1906, including in this total the Spanish and British work just referred to.[a]

COST OF WORK.

The cost of the work in these three years has been for:

1905	$190,425
Purchase of *Fathomer* (amount paid this fiscal year)	65,235
Total	255,660
1906	259,027
1907	272,381

[a] A sketch showing the hydrographic and topographic surveys and triangulation effected by the Coast and Geodetic Survey to June 30, 1907, has bee omitted and is on file in the Bureau of Insular Affairs, War Department.

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OFFICE WORK.

To insure the speediest possible preparation, and communication to the public of the results in the Philippine Islands the preliminary office work, so far as practicable, is completed in the islands and the office in Manila is organized with this purpose steadily in view. The office divisions are the computing, chart construction, nautical, and correspondence and property. The director exercises general direction over all the divisions, decides on working grounds for the field parties, preparing specifications for the operations, plans schemes for charts, correction pieces and recommendations for new edition, revises chart drawings and nautical information prepared for publication, examines results of field operations, passes on all requisitions for supplies and repairs and the allotments and expenditures required for the Survey.

COMPUTING DIVISION.

This division takes charge of all the survey records (except topographical and hydrographical sheets), receipting for and registering all entries and preparing for forwarding to Washington all records required there, except in the classes just enumerated. When computations of the results of the survey have been made in the field they are verified in this division, which supplements any deficiency; and prepares all the physical and geographical data necessary for chart construction. Data is prepared here for the extension of field surveys and for the preparation of the hydrographic and topographic sheets which are gotten ready in the chart division for the use of the field parties.

From here is supplied most of the responses to the requests that are constantly being received from the army, civil bureaus and public for information for engineering, cadastral, and general improvement purposes.

CHART CONSTRUCTION.

This division has charge of all operations connected with the preparation of charts; in it are received for transmission to the Washington office all the topographic and hydrographic sheets of the survey; sheets not inked in the field are completed, using the corrected data received from the computing division, and the final verification of topographic and hydrographic sheets is made. The drawings for new charts are constructed here and prepared for publication in Washington, and hydrographic and topographic sheets containing all available data are prepared for the field parties, as also miscellaneous tracings and drawings required from time to time by the office, or furnished officially for other offices of the General Insular Government.

Chart drawings forwarded to Washington for printing, July 1, 1906, to June 30, 1907.

No.	Title.
4240	Manila and Subic bays.
4257	Anchorages in vicinity of Verde Island Passage.
4442	Port Romblon (new edition, entirely redrawn).
4649	Malalag Bay.
4619	Eastern part of Illana Bay (new edition, entirely redrawn).
4449	Port Palapag and Laoang Bay.
4719	Surigao Strait (addition for new edition).
4645	Vicinity of Zamboanga.
4266	Ports Masinloc and Matalvi (new edition, almost entirely redrawn).
4267	Pagbilao and Laguimanoc bays, and Lucena anchorage.
4641	Murcielagos Bay (new edition, entirely redrawn).
4722	Sulu Archipelago (addition for new edition).
4210	Dasol Bay to Iba.
4648	Vicinity of Davao and Pakiputan Strait.
4343	Puerto Princesa (new edition, entirely redrawn).
4222	Lagonoy Gulf to Sisiran Bay (new edition, almost entirely redrawn).
4243	Manila and Cavite anchorages (new edition, extensive addition).
4723	Western Mindanao (new edition, 50 per cent redrawn).
4209	Lingayen Gulf (new edition, 30 per cent redrawn).
4447	Cebu Harbor approaches (new edition, entirely redrawn).
4460	Iloilo Strait (additions for new edition).
4220	San Bernardino Strait (addition for new edition).
	Total..... 22 charts.

Eight of the above are new charts, 9 are complete redrawings for new edition, and 5 are extensive correction drawings for new edition.

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Charts published in Washington, July 1, 1906, to June 30, 1907.

No.	Title.
4259	Rapurapu Strait (new edition).
4544	Siasi and Lapac islands.
4512	Samales islands.
4309	Balabac Strait.
4713	East coast of Luzon (new edition).
4718	Panay, Negros, and Cebu, with parts of Bohol and Leyte (new edition).
4711	Northern Luzon.
4257	Anchorages in vicinity of Verde Island Passage.
4647	Agusan River entrance.
4240	Manila and Subic bays.
4460	Iloilo Strait.
4449	Port Palapag and Laoang Bay.
4461	Oras to Sula Bay.
4442	Port Romblon (new edition).
4715	Southeastern Luzon (new edition).
4619	Eastern part of Iliana Bay (new edition).
4420	Parts of Samar and Leyte.
4649	Malalag Bay.
4543	Isabela Channel.
	Total ..... 19 charts.

Chart drawings in progress, June 30, 1907.

No.	Title.	State of progress, in percentage.
4416	Iloilo and Guimaras straits	95
4714	Mindoro and adjacent coasts	90
4717	Cuyos and Cagayanes islands	55
4713	Eastern Luzon	15
4223	Daet to Sisiran Bay, San Miguel Bay and approaches to Nueva Caceres	40
4421	Catarman to Oras	40
4426	Southwest coast of Leyte, Ormoc to Maasin	80
4715	Southeastern Luzon	20
	Total ..... 9 chart drawings.	

NAUTICAL DIVISION.

This division has charge of the receipt, hand corrections, and issue of all the charts and nautical publications of the survey. Here are prepared and corrected to date the sailing directions for the archipelago; the notices to mariners which give the earliest possible information of every subject properly affecting charts which is brought to our attention. Files of every chart of any value for these islands are kept on hand and freely placed at the disposal of all interested. Shipmasters in this division find readily available for their use all the data we can collect and are invited to bring here their charts for inspection and correction. At the request of the director of the bureau of navigation, the chief of this division has been named a member of the light-house board for the archipelago. The ship records and reports are filed in this division; which also assists in the inspection for decision on repairs of magnitude and for any extensive outfitting necessary for coast and geodetic survey vessels.

The following publications have been prepared, verified, and published: Notice to Mariners, numbers 1 to 10, 1906; Notice to Mariners, numbers 1 to 7, 1907.

Sailing directions, Section III, Panay, Negros, Cebu, and adjacent islands, 1906 (third edition).

DISTRIBUTION OF PUBLICATIONS

Charts sold	2,376
Official use	5,631
Total	8,007
Tide Tables	204
Sailing Directions, Philippine Islands	1,736
Notice to Mariners, Philippine Islands	7,774
Chart Catalogues	116

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This summary is exclusive of the number of publications sent to Washington for distribution. The increase in the quantity of charts sold this year over the sales for last year is 34 per cent.

CORRESPONDENCE AND PROPERTY DIVISION.

This division has charge of all the clerical and property operations of the survey. The difference in requirements of the two departments under which we are operating makes an unusually heavy amount of clerical labor when compared to ordinary coast and geodetic survey requirements.

In the office sections just named throughout the year Mr. E. R. Frisby, chief computer, has been in charge of the computing division; Mr. John Bach, chief cartographer, has had charge of the chart construction division; Capt. John C. Dow, nautical expert, had charge of the nautical division, and Mr. W. H. MacDonald has been chief clerk and in charge of the correspondence and property division.

CONCLUSION.

Mr. G. R. Putnam, assistant, coast and geodetic survey, was director of coast surveys from July 1 to July 14; on the last date he was succeeded by Mr. John E. McGrath, assistant, coast and geodetic survey.

The joint arrangement between the general and insular governments under which the survey is operated remained unchanged.

There have been constant exchanges of information and good offices between the survey and the various military and civil interests having common aims, and the experience of the director is that the most gratifying interest has been shown in meeting all of his requests for information, while on our part the aim of the survey has been to aid in every possible way that propriety would permit in giving the widest publicity to all information of value that comes in its possession.

Special mention must be made of the obligation we feel for many favors to the chief engineer of the Philippine Division, chief of military information division, bureau of navigation, and its light-house and port works divisions, the bureau of public works, the bureau of forestry, and the bureau of customs.

In return the army has been supplied with information for nearly all of the numerous parties recently employed on the military survey made of the country contiguous to Manila, and for work in Samar and Mindanao; the bureau of public lands has been furnished very complete data for its cadastral work, and the bureau of forestry has been similarly accommodated. Information has also been fully furnished to the engineers engaged in the extensive schemes of railway development which are now in progress in various sections of the archipelago.

In addition to the above the office is being constantly called on by other branches of the government and by private parties for information and results which are supplied whenever practicable to the fullest extent of our means.

The sketch hereto attached shows the progress to June 30, 1907, of the triangulation, hydrography, topography, latitude and longitude work executed by the coast and geodetic survey in the Philippine Islands.

Very respectfully,

JOHN E. MCGRATH,
Director of Coast Surveys.

To the honorable the SECRETARY OF COMMERCE AND POLICE,
Manila, P. I.

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APPENDIX.

COMPILATION OF LAWS AND REGULATIONS RELATING TO PUBLIC LANDS IN THE PHILIPPINE ISLANDS.

FEBRUARY 1, 1908.

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LAWS AND REGULATIONS RELATING TO PUBLIC LANDS IN THE PHILIPPINE ISLANDS.

AREA OF THE PUBLIC DOMAIN IN THE PHILIPPINE ISLANDS.

The first Philippine Commission, usually known as the Schurman Commission, in its report states (Part IV, p. 91):

"It has been impossible to obtain accurate data or information with reference to the public lands and other public property belonging to the Spanish Government as sovereign in the archipelago. * * * From general information gathered from various sources, particularly from natives acquainted with the provinces, the opinion has been formed that the public domain in the archipelago is very large. Some place it as high as one-half of the area of the archipelago.

"For the most part these lands are in the more remote and inaccessible portions of the islands, being the mountains, the uplands, and other lands more or less remote from means of communication. It is said, for instance, that of the province of La Union, which, with respect to mountains, uplands, and remote lands, may be taken as an average mountain province, one-half is public domain. These lands are wild and wooded, in many cases with valuable growing timber standing upon them. The mines of coal, iron, copper, gold, and other mineral deposits, which by many are believed to abound in the islands, are in a large measure, it is said, to be found upon this public domain. So far as has been learned, the surveys of this land have been meager and very incomplete. When proper means of communication have been developed and proper measures adopted for taking advantage of the benefits of these lands they will doubtless form a large reserve source for the benefit of the government of the islands."

The first report of the Taft Commission, which bears date of November 30, 1900, contains the following statement relative to the public lands: "The total amount of land in the Philippine Islands is approximately 29,694,500 hectares, or 73,345,415 acres. Of this amount it is estimated that about 2,000,000 hectares, or about 4,940,000 acres, are owned by individuals, leaving in public lands 27,694,500 hectares, or 68,405,415 acres. The land has not been surveyed and these are mere estimates. Of the public lands there are about twice or three times as much forest land as there is waste land. The land is most fertile and for the greater part naturally irrigated. There was a very great demand for this land, but owing to the irregularities, frauds, and delays in the Spanish system, the natives generally abandoned efforts to secure a good title and contented themselves with remaining on the land as simple squatters, subject to eviction by the State. In 1894 the Minister for the Colonies reported to the Queen of Spain that there were about 200,000 squatters on the public lands, but it is thought by employees in the forestry bureau, who have been in a position to know, that there are fully double that number. In the various islands of the archipelago the proportion of private land to public land is about as stated above, except in Mindanao, Mindoro, and Palawan (Paragua), where the proportion of public land is far greater."

Capt. George P. Ahern, in charge of the Bureau of Forestry in the Philippines, in his annual report dated July 30, 1901, in speaking of the area of forest lands says:

"The Philippine Islands lie between 4° 45′ and 21° north latitude and between 116° and 127° east longitude, with an area of 119,542 square miles. The islands are all mountainous, some of the high peaks having an altitude close to 9,000 feet above the sea. In many of the islands the steep mountain slopes

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begin close to the seacoast, and to the casual observer the entire area is woodland. It has been estimated that of the 73,000,000 acres in the islands more than 6,000,000 are under cultivation. (Jordana, 1890.)

"We find various estimates for the forest area by former officials.

"The official geographic statistics of 1876 fix the forest area at 51,537,243 acres.

"Fernando Castro estimated the forest area in 1890 at 48,112,920 acres. This includes all woodland, private as well as public land.

"As one travels over the islands he is constantly struck with the large population to the square mile and the scarcity of timber close to the main traveled routes and centers of population. As one leaves the main traveled routes vast virgin forests are met with, rich in valuable hard woods, dyewoods, gums, and other products, waiting for the skill and enterprise of the American capitalist. On the island of Cebu, where we find a population of 290 to the square mile, not a merchantable stick of timber is evident, with the exception of a small tract of forest left in the northern end of this island, which forest must therefore be carefully looked after.

"The island of Panay, with a population of 150 to the square mile, is almost denuded of good timber. In Luzon, where the population averages 78 to the square mile, we find no timber in the vicinity of centers of population. As we travel over the only line of railway in the islands, from Manila to Dagupan, a distance of 120 miles, we fail to see a single merchantable stick within several miles of the road; but there are tracts in various parts of Luzon where much valuable timber remains. In the northern end of the island, in Cagayan and Isabela provinces, there are at least 2,000,000 acres of valuable forest remaining. The entire east coast of Luzon, from the northern end as far south as Atimonan, comprising several million acres, is practically a virgin forest. In northwestern Luzon very little merchantable timber is left, with the exception of the slopes above 3,000 feet, where we found a species of pine (*Pinus Insularis*) flourishing, all ages mingled together. The maximum pines seen were close to 4 feet in diameter and more than 100 feet in height. Here the pine obtains a diameter of 12 inches in about twenty years. Almost every acre of these northwestern mountains is burnt over each year by the savages, but the larger pines seem to survive these repeated scorchings. Through central Luzon the timber has been cut away, leaving small tracts of fairly good forest in a few places. In southern Luzon, in Tayabas, and the Camarines, we find some large tracts fairly well covered with a variety of valuable tree species.

"As we enter the southwestern islands, extending from Mindoro through to Paragua, we leave the more traveled routes and find a sparsely settled region where the virgin forests have been apparently untouched. In this group you will find upward of 4,000,000 acres of virgin forest extending from the water's edge to the summits of the mountains. Some cutting has been done in this region, but it has amounted to a mere thinning of the edges of the forest. This group of islands is celebrated for the great quantity of narra, or Philippine mahogany, molave, ipil, and calantas (the Philippine cedar). Here we find valuable hard woods 4 or 5 feet in diameter with magnificent clear trunks for 80 feet up to the first limb. As a rule we find all over the islands that the largest trees have not been felled, owing to the lack of facilities for handling heavy timbers. Very little cleared land is found in Mindoro. Its reputation as a death trap for white men will change, as a few hundred square miles are cleared of timber and its rich soil devoted to agriculture. A vigorous thinning of at least 50 per cent of the present forest growth of Mindoro and Paragua would make them much more salubrious than at present. The island of Mindanao, with an area of more than 23,000,000 acres, is almost entirely covered by forest. The vast majority of the population of this island is found in coast towns, with the exception of the region in the north surrounding the Laguna de Lanao, where we find a large population of Moros. Very little timber has been cut in this island, owing to the scarcity of labor and the distance to market. It would be safe to estimate at least 10,000,000 acres of virgin forest for this island alone. The southern part of this island, in the region southeast of Cotabato, is noted for its gutta-percha, rubber, and other gums. More than $300,000 was paid at Cotabato for these gums last year, all of which product was shipped to Singapore. There are a number of rivers in this island sufficiently large for log-driving purposes.

"Of the other larger islands we find valuable forests in the islands of Leyte and Samar. The island of Negros has been cut over rather thoroughly for a

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great many years, and it will not be long before it will be in the same condition as the island of Cebu, if the forests are not protected. This island (Negros), prior to June, 1901, was under a separate government with its own forestry service. The forestry bureau at Manila now has jurisdiction in this island, and will promptly introduce the forestry officials trained at Manila, enforce there the forestry regulations, and protect what is left of their forests. We may safely estimate that there are at least 20,000,000 acres of virgin forest in these islands, with an average of at least 15,000 feet board measure of valuable hard wood to the acre.

"Up to the present date the Bureau has listed 665 native tree species, of several hundred of which little more is known than their names. During the past year about 160 different native woods have entered the market, the most valuable of which for construction purposes is molave. Molave, ipil, yacal, and dungon are remarkable for their durability and strength. The qualities of a few of these woods are very well known to the natives, and the specifications for the main timbers in house construction carefully provide that the timbers used shall be some of these mentioned. In addition to their value in ordinary construction they have exceptional qualities when used as paving blocks. Two of the bridges in Manila were paved with molave blocks about six years ago, have been subjected to the heaviest traffic in the city, and, apparently, at the present date, not a single block has been splintered. The calantas, or Philippine cedar, is almost entirely used in making cigar boxes. Narra, tindalo, acle, and luan are used principally as furniture woods. Betis, aranga, and dungon are generally used as piles, for which there is a great demand in the Manila market. The other important construction woods are baticulin, batitinan, amuguis, guijo, apitong, panao, sacat, balacat, malabulac, and malasantol."

NOTES ON GEOGRAPHY AND POPULATION IN THE PHILIPPINES.

"Philippine Islands: Magellan landed in Cebu 1521; Manila occupied 1565 by Salcedo. Latitude 4° 45′ north to 21° north; longitude 116° east to 127° east. Charts show 948 to 1,725 islands. Areas given by Philippine Commission, 119,542 square miles."

1874:	Acres.
Vidal-Area-Map-Coella	71, 989, 385
Map, Hydrographic Office	73, 345, 415
Per annual statement	73, 009, 495

Geographic statistics.

1876:	
Area	69, 756, 245
City property	432, 625
Cultivated land	5, 632, 641
Uncultivated land	12, 153, 746
Forest land	51, 537, 243
1890:	
Jordana, area approximated	69, 160, 000
Area cultivated land	6, 175, 000
Fernando Castro, forest area	48, 112. 920
Land occupied by Moros and independent tribes	24, 700, 000

The chief of the bureau of public lands, in his annual report dated September 1, 1903, makes the following statement relative to the area of the public domain:

"Accurate information on this subject can not be furnished at the present time, because of the lack of a proper system of surveys and of any trustworthy data among the Spanish land titles in my custody.

"Nearly two years ago I made an examination of the writings of a number of Spanish officials who had served in the Philippines, and upon their statements estimated the total area of the islands at about 72,000,000 or 73,000,000 acres.

"The only information I have in regard to the area of lands now in private ownership is based upon statements of persons who were born in the islands and who were employed in the Inspección General de Montes, which office was the

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predecessor, under the Spanish Government, of the present bureau of forestry. These persons estimated that the area in private ownership did not exceed 12,000,000 acres.

"Assuming the correctness of my estimate of 73,000,000 acres for the total area of the islands, that would leave 61,000,000 acres of land belonging to the public domain.

"The chief of the bureau of forestry estimates the forest lands on the public domain at about 40,000,000 acres. This would leave an area of 21,000,000 acres of land not forested, the most of which is agricultural in character, and which will be subject to disposal under the law permitting leasing, selling, and homesteading as soon as the act now awaiting the final action of the Commission shall have received the express or implied sanction of Congress."

The latest estimates of the area of the Philippine Islands are those contained in the recent census, and were calculated by Mr. George R. Putnam of the United States Coast and Geodetic Survey, and are as follows:

NUMBER OF ISLANDS HAVING AN AREA OF—

10,000 square miles or more	2
1,000 square miles or more and less than 10,000 square miles	9
100 square miles or more and less than 1,000 square miles	20
10 square miles or more and less than 100 square miles	73
1 square mile or more and less than 10 square miles	262
0.1 square mile or more and less than 1 square mile	728
Less than 0.1 square mile	2,046
Total	3,141

Total area of the Philippine Islands 115,026 square statute miles.

Islands of the Philippine Archipelago having an area larger than 100 square miles.

Order.	Island.	Area.	Order.	Island.	Area.
		Sq. m.			*Sq. m.*
1	Luzon	40,969	17	Jolo	326
2	Mindanao	36,292	18	Tablas	324
3	Samar	5,031	19	Dinagat	309
4	Negros	4,881	20	Tawi Tawi	232
5	Panay	4,611	21	Guimaras	228
6	Paragua	4,027	22	Burias	197
7	Mindoro	3,851	23	Biliran	190
8	Leyte	2,722	24	Sibuyan	171
9	Cebu	1,762	25	Culion	153
10	Bohol	1,441	26	Siargao	151
11	Masbate	1,236	27	Samal	147
12	Catanduanes	682	28	Balabac	122
13	Basilan	478	29	Dumaran	122
14	Busuanga	390	30	Ticao	121
15	Marinduque	352	31	Siquijor	106
16	Polillo	333			

The above areas include, of course, all the land in the islands and give no information as to the amount of the public domain. From other data furnished by the census it is possible to arrive at the amount of land devoted to agriculture. In discussing the agricultural lands the census states:

"In most sections of the Philippine Islands the lands used for agriculture, located within the limits of territory having a Christian population, are greatly subdivided, and, consequently, individual holdings are frequently of very small areas. Nearly half the parcels of occupied lands to which the tables relate (49.8 per cent) are less than one hectare (2.471 acres) in size; while thousands of tracts, the total number of which constitutes 21.7 per cent of the holdings embraced by the tables are smaller than 35 ares, and are being equivalent to 0.0247 of an acre, or about 1,075 square feet. These small parcels of land, many of them no larger than ordinary kitchen gardens in the United States, are resided upon by, cultivated by, and contribute materially to the subsistence of their owners and occupants; and the presentation of agricultural statistics

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for the Philippines would be extremely faulty and incomplete were they not included. They are, however, too small to be properly called 'farms.' For convenience, however, in discussing the tables, all agricultural holdings will be referred to as 'farms,' regardless of size.

"The people of the Philippines are extremely gregarious. The isolated farmhouse, so familiar in rural sections throughout the United States, is practically unknown in these islands, whose inhabitants almost universally live in communities and largely subsist on such products of the soil as can be cultivated or gathered from wild growths in the immediate vicinity of their dwelling places.

"This custom of herding together is not due alone to the social, company-loving disposition of the people. It has been rendered necessary by the ladronism and the raids of Moros that prevailed throughout the islands for centuries. The piratical Moros have, in earlier times, raided the islands as far north as Northern Luzon, until half a century ago Spain put a stop to it. These, with the marauding bands of ladrones that have infested the most productive portions of the archipelago, have rendered farm life, in the American sense, impracticable, and have forced the people to live in more or less closely settled communities for purposes of protection and defense against the incursions of the robbers. This has been one of the greatest obstacles in the way of agricultural development and is in a large degree the cause of the numerous small land holdings. Another reason is the great productiveness of the soil and the variety of crops that can be raised on a small piece of land.

"The spaces of land between their villages are, as a rule, unpopulated, and these intervening tracts, frequently of great extent, are almost wholly uncultivated and practically unused, except in a limited way for grazing purposes or in the utilization of such wild growths of fruits, vegetables, or fiber plants as they produce. The average size of all farms in the Philippines is only 546.8 ares, equivalent to 8.57 acres. In the United States the average size of all farms is shown by the census of 1900 to have been 146.6 acres, making a ratio as to size of about 17 to 1.

"The small proportion of land in farms or agricultural lands, as compared with the total areas of the various provinces, comandancias, and islands, is shown by the two following tables:

Total area and area of agricultural land, by provinces and comandancias, arranged in the order of the magnitude of the percentage of agricultural lands reported.

In order of magnitude.	Province or comandancia.	Area in hectares.[a]		Per cent agricultural.
		Total.	Agricultural.	
	Philippine Islands	29,791,734	2,827,704	9.5
1	La Laguna	162,911	86,426	51.1
2	Pampanga	224,812	105,677	47.0
3	Sorsogon	195,545	88,829	45.4
4	Pangasinan	308,987	119,771	38.8
5	Ilocos Sur	121,989	47,176	38.7
6	Batangas	311,059	117,422	37.7
7	Iloilo	524,903	176,955	33.7
8	Bulacan	303,807	90,220	29.7
9	La Union	164,206	43,077	26.2
10	Cebu	502,201	130,624	26.0
11	Cavite	160,321	40,881	25.5
12	Tarlac	312,095	78,923	25.3
13	Albay	461,797	116,084	25.1
14	Capiz	452,991	108,692	24.0
15	Negros Occidental	810,670	177,642	21.9
16	Abra	303,289	52,086	17.2
17	Leyte	779,072	133,620	17.2
18	Ilocos Norte	344,470	55,633	16.2
19	Nueva Ecija	561,771	90,367	16.1
20	Romblon	148,407	23,546	15.9
21	Bohol	391,349	58,099	14.8
22	Manila City	5,180	738	14.2
23	Ambos Camarines	849,261	106,371	12.5
24	Cagayan	1,308,468	138,166	10.6
25	Antique	293,706	27,194	9.3
26	Zambales	550,375	45,917	8.3

[a] One hectare equals 2,471 acres.

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Total area and area of agricultural land, by provinces and comandancias, etc.—Continued.

In order of magnitude.	Province or comandancia.	Area in hectares.		Per cent agricultural.
		Total.	Agricultural.	
27	Negros Oriental	482,776	37,971	7.9
28	Rizal	189,847	14,787	7.8
29	Samar	1,366,484	101,481	7.4
30	Tayabas [a]	1,645,686	120,754	7.3
31	Misamis	978,243	59,269	6.1
32	Bataan	139,083	8,232	5.9
33	Isabela	1,299,662	67,716	5.2
34	Mindoro	1,042,216	42,424	4.1
35	Surigao	1,809,892	49,060	2.7
36	Masbate	406,371	9,798	2.4
37	Basilan [b]	134,680	2,276	1.7
38	Paragua	618,751	9,032	1.5
39	Zamboanga [b]	791,504	10,588	1.3
40	Dapitan [b]	521,885	5,374	1.0
41	Nueva Vizcaya	505,050	4,421	.9
42	Davao [b]	2,514,113	16,343	.7
43	Siassi [b]	23,051	133	.6
44	Lepanto-Bontoc	519,295	1,741	.3
45	Cotabato [b]	3,052,574	5,286	.2
46	Paragua Sur [b]	737,891	626	.1
47	Benguet	212,898	233	.1
48	Jolo [b]	142,450	23	(c)
	Tawi Tawi [b]	103,600	(d)	(d)

[a] Including the subprovince, Marinduque.
[b] Comandancia.
[c] Less than one-tenth of 1 per cent.
[d] No agricultural land reported.

Total area and area of agricultural land, by islands, arranged in the order of the magnitude of the percentage of agricultural land.

In order of magnitude.	Island.	Area in hectares.		Per cent agricultural.
		Total.	Agricultural.	
	Philippine Islands	**29,791,734**	**2,827,704**	**9.5**
1	Cebu	456,358	119,989	26.3
2	Panay	1,194,249	294,487	24.7
3	Leyte	704,998	123,754	17.6
4	Marinduque	91,168	15,598	17.1
5	Negros	1,264,179	210,452	16.6
6	Luzon	10,610,971	1,592,289	15.1
7	Bohol	373,219	53,160	14.2
8	Samar	1,308,029	85,892	6.6
9	Mindoro	997,409	39,138	3.9
10	Masbate	320,124	5,222	1.6
11	Mindanao	9,399,628	127,534	1.4
	All other islands	3,076,402	160,190	5.2

These estimates reduced to acres give for the entire archipelago 73,615,374 acres, of which 6,987,256 were in farms. It is not known whether the land reported by the census as being in farms or agricultural lands includes all the land of private ownership, but comparing the census figures with the previous estimates given it would appear that most of the private land is thus included.

The three estimates that have been made of the lands in the islands, placed in tabular form, are as follows:

Authority.	Total area, in acres.	Public domain, in acres.
Taft Commission	73,345,415	68,405,415
Chief bureau public lands	73,000,000	61,000,000
Census estimate	73,615,374	66,628,118

It will be seen by reference to the table on page 5 that but one province, La Laguna, has over 50 per cent of land in farms, while the great island of Mindanao reports but 1.4 per cent of the land as being in farms.

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ACTS OF CONGRESS AND THE PHILIPPINE COMMISSION.

CONGRESSIONAL LEGISLATION.

The Act of Congress approved July 1, 1902, entitled, "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," granted authority to the Philippine Commission to dispose of the public domain under the conditions set forth therein. The above Act was amended in certain sections by the Act of February 6, 1905, which changed the original measurements from acres, feet, etc., to the metric system of measurements, and the law as printed herewith includes all the legislation by Congress relative to the lands of the Philippine Islands at present in force.

All the Acts and regulations of the Philippine Commission are based upon these two Acts of Congress.

[PUBLIC—No. 235.]

AN ACT Temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes, approved July 1, 1902, as amended by Public—No. 43, approved February 6, 1905.

* * * * * * *

SEC. 12. That all the property and rights which may have been acquired in the Philippine Islands by the United States under the treaty of peace with Spain, signed December tenth, eighteen hundred and ninety-eight, except such land or other property as shall be designated by the President of the United States for military and other reservations of the Government of the United States, are hereby placed under the control of the government of said islands to be administered for the benefit of the inhabitants thereof, except as provided in this Act.

SEC. 13. That the government of the Philippine Islands, subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof and unless disapproved or amended by Congress at said session they shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

SEC. 14. That the government of the Philippine Islands is hereby authorized and empowered to enact rules and regulations and to prescribe terms and conditions to enable persons to perfect their title to public lands in said Islands, who, prior to the transfer of sovereignty from Spain to the United States, had fulfilled all or some of the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the acquisition of legal title thereto yet failed to secure conveyance of title; and the Philippine Commission is authorized to issue patents, without compensation, to any native of said Islands, conveying title to any tract of land not more than sixteen hectares in extent, which were public lands and had been actually occupied by such native or his ancestors prior to and on the thirteenth of August, eighteen hundred and ninety-eight.

SEC. 15. That the government of the Philippine Islands is hereby authorized and empowered, on such terms as it may prescribe, by general legislation, to provide for the granting or sale and conveyance to actual occupants and settlers and other citizens of said islands such parts and portions of the public domain, other than timber and mineral lands, of the United States in said islands as it

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may deem wise, not exceeding sixteen hectares to any one person and for the sale and conveyance of not more than one thousand and twenty-four hectares to any corporation or association of persons: *Provided*, That the grant or sale of such lands, whether the purchase price be paid at once or in partial payments, shall be conditioned upon actual and continued occupancy, improvement, and cultivation of the premises sold for a period of not less than five years, during which time the purchaser or grantee can not alienate or encumber said land or the title thereto; but such restriction shall not apply to transfers of rights and title of inheritance under the laws for the distribution of the estates of decedents.

SEC. 16. That in granting or selling any part of the public domain under the provisions of the last preceding section, preference in all cases shall be given to actual occupants and settlers; and such public lands of the United States in the actual possession or occupancy of any native of the Philippine Islands shall not be sold by said government to any other person without the consent thereto of said prior occupant or settler first had and obtained: *Provided*, That the prior right hereby secured to an occupant of land, who can show no other proof of title than possession, shall not apply to more than sixteen hectares in any one tract.

SEC. 17. That timber, trees, forests, and forest products on lands leased or demised by the government of the Philippine Islands under the provisions of this Act shall not be cut, destroyed, removed, or appropriated except by special permission of said government and under such regulations as it may prescribe.

All moneys obtained from lease or sale of any portion of the public domain or from licenses to cut timber by the government of the Philippine Islands shall be covered into the insular treasury and be subject only to appropriation for insular purposes according to law.

SEC. 18. That the forest laws and regulations now in force in the Philippine Islands, with such modifications and amendments as may be made by the government of said islands, are hereby continued in force, and no timber lands forming part of the public domain shall be sold, leased, or entered until the government of said islands, upon the certification of the forestry bureau that said lands are more valuable for agriculture than for forest uses, shall declare such lands so certified to be agricultural in character: *Provided*, That the said government shall have the right and is hereby empowered to issue licenses to cut, harvest, or collect timber or other forest products on reserved or unreserved public lands in said islands in accordance with the forest laws and regulations hereinbefore mentioned and under the provisions of this Act, and the said government may lease land to any person or persons holding such licenses, sufficient for a mill site, not to exceed four hectares in extent, and may grant rights of way to enable such person or persons to get access to the lands to which such licenses apply.

SEC. 19. That the beneficial use shall be the basis, the measure, and the limit of all rights to water in said islands, and the government of said islands is hereby authorized to make such rules and regulations for the use of water, and to make such reservations of public lands for the protection of the water supply, and for other public purposes not in conflict with the provisions of this Act, as it may deem best for the public good.

MINERAL LANDS.

SEC. 20. That in all cases public lands in the Philippine Islands valuable for minerals shall be reserved from sale, except as otherwise expressly directed by law.

SEC. 21. That all valuable mineral deposits in public lands in the Philippine Islands, both surveyed and unsurveyed, are hereby declared to be free and open to exploration, occupation, and purchase, and the land in which they are found to occupation and purchase, by citizens of the United States, or of said Islands; *Provided*, That when on any lands in said Islands entered and occupied as agricultural lands under the provisions of this Act, but not patented, mineral deposits have been found, the working of such mineral deposits is hereby forbidden until the person, association, or corporation who or which has entered and is occupying such lands shall have paid to the Government of said Islands such additional sum or sums as will make the total amount paid for the mineral claim or claims in which said deposits are located equal to the amount charged by the Government for the same as mineral claims.

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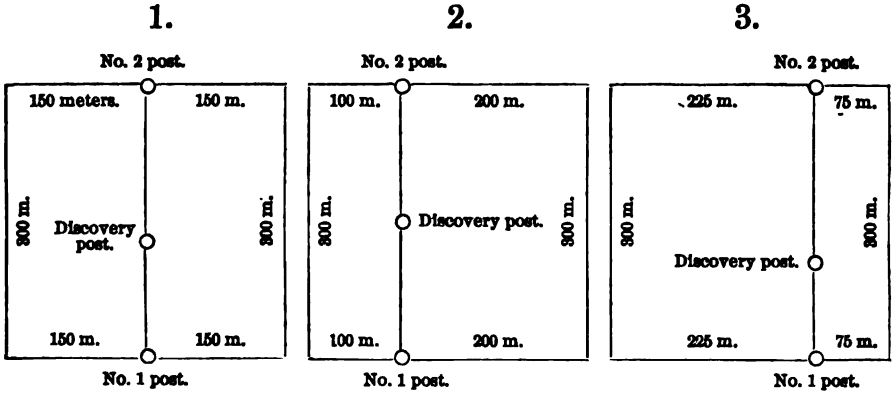
SEC. 22. (*As amended by act of Congress approved February 6, 1905.*) That mining claims upon land containing veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits located after the passage of this Act, whether located by one or more persons qualified to locate the same under the preceding section, shall be located in the following manner and under the following conditions: Any person so qualified desiring to locate a mineral claim shall, subject to the provisions of this Act with respect to land which may be used for mining, enter upon the same and locate a plat of ground measuring, where possible, but not exceeding three hundred meters in length by three hundred meters in breadth, in as nearly as possible a rectangular form—that is to say, all angles shall be right angles, except in cases where a boundary line of a previously surveyed claim is adopted as common to both claims, but the lines need not necessarily be meridional. In defining the size of a mineral claim it shall be measured horizontally, irrespective of inequalities of the surface of the ground.

SEC. 23. (*As amended by act of Congress approved February 6, 1905.*) That a mineral claim shall be marked by two posts, placed as nearly as possible on the line of the ledge or vein, and the posts shall be numbered one and two, and the distance between posts numbered one and two shall not exceed three hundred meters, the line between posts numbered one and two to be known as the location line; and upon posts numbered one and two shall be written the name given to the mineral claim, the name of the locator, and the date of the location. Upon post numbered one there shall be written, in addition to the foregoing, "Initial post," the approximate compass bearing of post numbered two, and a statement of the number of meters lying to the right and to the left of the line from post numbered one to post numbered two, thus "Initial post. Direction of post numbered two . meters of this claim lie on the right and meters on the left of the line from number one to number two post." All the particulars required to be put on number one and number two posts shall be furnished by the locator to the provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, in writing, at the time the claim is recorded, and shall form a part of the record of such claim.

SEC. 24. (*As amended by act of Congress approved February 6, 1905.*) That when a claim has been located the holder shall immediately mark the line between posts numbered one and two so that it can be distinctly seen. The locator shall also place a post at the point where he has found minerals in place, on which shall be written "Discovery post:" *Provided*, That when the claim is surveyed the surveyor shall be guided by the records of the claim, the sketch plan on the back of the declaration made by the owner when the claim was recorded, posts numbered one and two, and the notice on number one, the initial post.

"*Examples of various modes of laying out claims.*



NOTE.—See section 8 of Act No. 624 of the Philippine Commission (page 494), which requires corner posts in addition to above.

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SEC. 25. (*As amended by act of Congress approved February 6, 1905.*) That it shall not be lawful to move number one post, but number two post may be moved by the deputy mineral surveyor when the distance between posts numbered one and two exceeds three hundred meters, in order to place number two post three hundred meters from number one post on the line of location. When the distance between posts numbered one and two is less than three hundred meters, the deputy mineral surveyor shall have no authority to extend the claim beyond number two.

SEC. 26. That the "location line" shall govern the direction of one side of the claim, upon which the survey shall be extended according to this Act.

SEC. 27. That the holder of a mineral claim shall be entitled to all minerals which may lie within his claim, but he shall not be entitled to mine outside the boundary lines of his claim continued vertically downward: *Provided*, That this Act shall not prejudice the rights of claim owners nor claim holders whose claims have been located under existing laws prior to this Act.

SEC. 28. That no mineral claim of the full size shall be recorded without the application being accompanied by an affidavit made by the applicant or some person on his behalf cognizant of the facts—that the legal notices and posts have been put up; that mineral has been found in place on the claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the number one and number two posts shall be set out in full, and as accurate a description as possible of the position of the claim given with reference to some natural object or permanent monuments.

SEC. 29. (*As amended by act of Congress approved February 6, 1905.*) That no mineral claim which at the date of its record, is known by the locator to be less than a full-sized mineral claim, shall be recorded without the word "fraction" being added to the name of the claim, and the application being accompanied by an affidavit or solemn declaration made by the applicant or some person on his behalf cognizant of the facts: That the legal posts and notices have been put up; that mineral has been found in place on the fractional claim proposed to be recorded; that the ground applied for is unoccupied by any other person. In the said declaration shall be set out the name of the applicant and the date of the location of the claim. The words written on the posts numbered one and two shall be set out in full, and as accurate a description as possible of the position of the claim given. A sketch plan shall be drawn by the applicant on the back of the declaration, showing as near as may be the position of the adjoining mineral claims and the shape and size, expressed in meters, of the claim or fraction desired to be recorded: *Provided*, That the failure on the part of the locator of a mineral claim to comply with any of the foregoing provisions of this section shall not be deemed to invalidate such location if, upon the facts, it shall appear that such locator has actually discovered mineral in place on said location and that there has been on his part a bona fide attempt to comply with the provisions of this Act, and that the nonobservance of the formalities hereinbefore referred to is not of a character calculated to mislead other persons desiring to locate claims in the vicinity.

SEC. 30. That in cases where, from the nature or shape of the ground, it is impossible to mark the location line of the claim as provided by this Act then the claim may be marked by placing posts as nearly as possible to the location line, and noting the distance and direction such posts may be from such location line, which distance and direction shall be set out in the record of the claim.

SEC. 31. (*As amended by act of Congress approved February 6, 1905.*) That every person locating a mineral claim shall record the same with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder of the district within which the same is situate, within thirty days after the location thereof. Such record shall be made in a book to be kept for the purpose in the office of the said provincial secretary or such other officer as by said Government described as mining recorder, in which shall be inserted the name of the claim, the name of each in meters, the date of location, and the date of the record. A claim which shall not have been recorded within the prescribed period shall be deemed to have been abandoned.

SEC. 32. That in case of any dispute as to the location of a mineral claim the title to the claim shall be recognized according to the priority of such loca-

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tion, subject to any question as to the validity of the record itself and subject to the holder having complied with all the terms and conditions of this Act.

SEC. 33. That no holder shall be entitled to hold in his, its, or their own name or in the name of any other person, corporation, or association more than one mineral claim on the same vein or lode.

SEC. 34. That a holder may at any time abandon any mineral claim by giving notice, in writing, of such intention to abandon, to the provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder; and from the date of the record of such notice all his interest in such claim shall cease.

SEC. 35. That proof of citizenship under the clauses of this Act relating to mineral lands may consist in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge or upon information and belief; and in case of a corporation organized under the laws of the United States, or of any State or Territory thereof, or of the Philippine Islands, by the filing of a certified copy of their charter or certificate of incorporation.

SEC. 36. (*As amended by act of Congress approved February 6, 1905.*) That the United States Philippine Commission or its successors may make regulations, not in conflict with the provisions of this Act, governing the location, manner of recording, and amount of work necessary to hold possession of a mining claim, subject to the following requirements:

On each claim located after the passage of this Act, and until a patent has been issued therefor, not less than two hundred pesos' worth of labor shall be performed or improvements made during each year: *Provided*, That upon a failure to comply with these conditions the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several coöwners to contribute his proportion of the expenditures required thereby, the coöwners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent coöwners personal notice in writing, or notice by publication in the newspaper published nearest the claim, and in two newspapers published at Manila, one in the English language and the other in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands, for at least once a week for ninety days; and if, at the expiration of ninety days after such notice in writing or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his coöwners who have made the required expenditures. The period within which the work required to be done annually on all unpatented mineral claims shall commence on the first day of January succeeding the date of location of such claim.

SEC. 37. (*As amended by act of Congress approved February 6, 1905.*) That a patent for any land claimed and located for valuable mineral deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this Act, having claimed and located a piece of land for such purposes, who has or have complied with the terms of this Act, may file in the office of the provincial secretary, or such other officer as by the Government of said Islands may be described as mining recorder of the province wherein the land claimed is located, an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the Chief of the Philippine Insular Bureau of Public Lands, showing accurately the boundaries of the claim, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such office, and shall thereupon be entitled to a patent for the land, in the manner following: The provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, upon the filing of such application, plat, field notes, notices, and affidavits, shall publish a notice that such an application has been made, once a week for the period of sixty days, in a newspaper to be by him designated as nearest to such claim, and in two newspapers published at Manila, one in the English language and one in the Spanish

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language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter within the sixty days of publication, shall file with the provincial secretary, or such other officer as by the Philippine Government may be described as mining recorder, a certificate of the Chief of the Philippine Insular Bureau of Public Lands that one thousand pesos' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the provincial secretary, or such other officer as by the Government of said Islands may be described as mining recorder, at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent upon the payment to the provincial treasurer, or the collector of internal revenue, of twenty-five pesos per hectare, and that no adverse claim exists; and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this Act: *Provided*, That where the claimant for a patent is not a resident of or within the province wherein the land containing the vein, ledge, or deposit sought to be patented is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent where said agent is conversant with the facts sought to be established by said affidavits.

SEC. 38. That applicants for mineral patents, if residing beyond the limits of the province or military department wherein the claim is situated, may make the oath or affidavit required for proof of citizenship before the clerk of any court of record, or before any notary public of any province of the Philippine Islands, or any other official in said Islands authorized by law to administer oaths.

SEC. 39. (*As amended by act of Congress approved February 6, 1905.*) That where an adverse claim is filed during the period of publication it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavits thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder, together with the certificate of the Chief of the Philippine Insular Bureau of Public Lands that the requisite amount of labor has been expended or improvements made thereon, and the description required in other cases, and shall pay to the provincial treasurer or the collector of internal revenue of the province in which the claim is situated, as the case may be, twenty-five pesos per hectare for his claim, together with the proper fees, whereupon the whole proceedings and the judgment roll shall be certified by the provincial secretary, or such other officer as by said Government may be described as mining recorder, to the Secretary of the Interior of the Philippine Islands, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, rightly to possess. The adverse claim may be verified by the oath of any duly authorized agent or attorney in fact of the adverse claimant cognizant of the facts stated; and the adverse claimant, if residing or at the time being beyond the limits of the province wherein the claim is situated, may make oath to the adverse claim before the clerk of any court of record, or any notary public of any province or military department of the Philippine Islands, or any other officer authorized to administer oaths where the adverse claimant may then be. If it appears from the decision of the court that several parties are entitled to separate and

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different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the Chief of the Philippine Insular Bureau of Public Lands, whereupon the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder shall certify the proceedings and judgment roll to the Secretary of the Interior for the Philippine Islands, as in the preceding case, and patents shall issue to the several parties according to their respective rights. If, in any action brought pursuant to this section, title to the ground in controversy shall not be established by either party, the court shall so find, and judgment shall be entered accordingly. In such case costs shall not be allowed to either party, and the claimant shall not proceed in the office of the provincial secretary or such other officer as by the Government of said Islands may be described as mining recorder or be entitled to a patent for the ground in controversy until he shall have perfected his title. Nothing herein contained shall be construed to prevent the alienation of a title conveyed by a patent or a mining claim to any person whatever.

SEC. 40. That the description of mineral claims upon surveyed lands shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for claims upon unsurveyed lands, the Chief of the Philippine Insular Bureau of Public Lands in extending the surveys shall adjust the same to the boundaries of such patented claim according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

SEC. 41. That any person authorized to enter lands under this Act may enter and obtain patent to lands that are chiefly valuable for building stone under the provisions of this Act relative to placer mineral claims.

SEC. 42. That any person authorized to enter lands under this Act may enter and obtain patent to lands containing petroleum or other mineral oils and chiefly valuable therefor under the provisions of this Act relative to placer mineral claims.

SEC. 43. That no location of a placer claim shall exceed sixty-four hectares for any association of persons, irrespective of the number of persons composing such association, and no such location shall include more than eight hectares for an individual claimant. Such locations shall conform to the laws of the United States Philippine Commission, or its successors, with reference to public surveys, and nothing in this section contained shall defeat or impair any bona fide ownership of land for agricultural purposes or authorize the sale of the improvements of any bona fide settler to any purchaser.

SEC. 44. That where placer claims are located upon surveyed lands and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims located after the date of passage of this Act shall conform as nearly as practicable to the Philippine system of public-land surveys and the regular subdivisions of such surveys; but where placer claims can not be conformed to legal subdivisions, survey, and plat shall be made as on unsurveyed lands; and where by the segregation of mineral lands in any legal subdivision a quantity of agricultural land less than sixteen hectares shall remain, such fractional portion of agricultural land may be entered by any party qualified by law for homestead purposes.

SEC. 45. That where such person or association, they and their grantors have held and worked their claims for a period equal to the time prescribed by the statute of limitations of the Philippine Islands, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this Act, in the absence of any adverse claim; but nothing in this Act shall be deemed to impair any lien which may have attached in any way whatever prior to the issuance of a patent.

SEC. 46. That the Chief of the Philippine Insular Bureau of Public Lands may appoint competent deputy mineral surveyors to survey mining claims. The expenses of the survey of vein or lode claims and of the survey of placer claims, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any such deputy mineral surveyor to make the survey. The Chief of the Philippine Insular Bureau of Public Lands shall also have power to establish the maximum charges for surveys and publication of notices under this Act; and in case of excessive charges for publication he may designate any newspaper published in a province where mines are situated, or in Manila, for the publication of mining notices and fix the rates

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to be charged by such paper; and to the end that the Chief of the Bureau of Public Lands may be fully informed on the subject such applicant shall file with the provincial secretary, or such other officer as by the Government of the Philippine Islands may be described as mining recorder, a sworn statement of all charges and fees paid by such applicant for publication and surveys, and of all fees and money paid the provincial treasurer or the collector of internal revenue, as the case may be, which statement shall be transmitted, with the other papers in the case, to the Secretary of the Interior for the Philippine Islands.

SEC. 47. That all affidavits required to be made under this Act may be verified before any officer authorized to administer oaths within the province or military department where the claims may be situated, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the proper provincial secretary or such other officer as by the Government of the Philippine Islands may be described as mining recorder. In cases of contest as to the mineral or agricultural character of land the testimony and proofs may be taken as herein provided on personal notice of at least ten days to the opposing party; or if such party can not be found, then by publication at least once a week for thirty days in a newspaper to be designated by the provincial secretary or such other officer as by said Government may be described as mining recorder published nearest to the location of such land and in two newspapers published in Manila, one in the English language and one in the Spanish language, to be designated by the Chief of the Philippine Insular Bureau of Public Lands; and the provincial secretary or such other officer as by said Government may be described as mining recorder shall require proofs that such notice has been given.

SEC. 48. That where nonmineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such nonadjacent surface ground may be embraced and included in an appplication for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; but no location of such nonadjacent land shall exceed two hectares, and payment for the same must be made at the same rate as fixed by this Act for the superficies of the lode. The owner of a quartz mill or reduction works not owning a mine in connection therewith may also receive a patent for his mill site as provided in this section.

SEC. 49. That as a condition of sale the Government of the Philippine Islands may provide rules for working, policing, and sanitation of mines, and rules concerning easements, drainage, water rights, right of way, right of Government survey and inspection, and other necessary means to their complete development not inconsistent with the provisions of this Act, and those conditions shall be fully expressed in the patent. The Philippine Commission or its successors are hereby further empowered to fix the bonds of deputy mineral surveyors.

SEC. 50. That whenever by priority of possession rights to the use of water for mining, agricultural, manufacturing, or other purposes have vested and accrued and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed, but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

SEC. 51. That all patents granted shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights as may have been acquired under or recognized by the preceding section.

SEC. 52. That the Government of the Philippine Islands is authorized to establish land districts and provide for the appointment of the necessary officers wherever they may deem the same necessary for the public convenience, and to further provide that in districts where land offices are established proceedings required by this Act to be had before provincial officers shall be had before the proper officers of such land offices.

SEC. 53. (*As amended by act of Congress approved February 6, 1905.*) That every person above the age of twenty-one years who is a citizen of the United

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States or of the Philippine Islands, or who has acquired the right of a native of said Islands under and by virtue of the treaty of Paris, or any association of persons severally qualified as above, shall, upon application to the proper provincial treasurer, have the right to enter any quantity of vacant coal lands of said Islands, not otherwise appropriated or reserved by competent authority, not exceeding sixty-four hectares to such individual person, or one hundred and twenty-eight hectares to such association, upon payment to the provincial treasurer or the collector of internal revenue, as the case may be, of not less than fifty pesos per hectare for such lands, where the same shall be situated more than twenty-five kilometers from any completed railroad or available harbor or navigable stream, and not less than one hundred pesos per hectare of such land as shall be within twenty-five kilometers of such road, harbor, or stream: *Provided*, That such entries shall be taken in squares of sixteen or sixty-four hectares, in conformity with the rules and regulations governing the public-land surveys of the said Islands in plotting legal subdivisions.

SEC. 54. That any person or association of persons, severally qualified as above provided, who have opened and improved, or shall hereafter open and improve, any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference right of entry under the preceeding section of the mines so opened and improved.

SEC. 55. That all claims under the preceding section must be presented to the proper provincial secretary within sixty days after the date of actual possession and the commencement of improvements on the land by the filing of a declaratory statement therefor; and where the improvements shall have been made prior to the expiration of three months from the date of the passage of this Act, sixty days from the expiration of such three months shall be allowed for the filing of a declaratory statement; and no sale under the provisions of this Act shall be allowed until the expiration of six months from the date of the passage of this Act.

SEC. 56. That the three preceding sections shall be held to authorize only one entry by the same person or association of persons; and no association of persons, any member of which shall have taken the benefit of such sections, either as an individual or as a member of any other association shall enter or hold any other lands under the provisions thereof; and no member of any association which shall have taken the benefit of such section shall enter or hold any other lands under their provisions; and all persons claiming under section fifty-four shall be required to prove their respective rights and pay for the lands filed upon within one year from the time prescribed for filing their respective claims; and upon failure to file the proper notice or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant.

SEC. 57. That in case of conflicting claims upon coal lands where the improvements shall be commenced after the date of the passage of this Act, priority of possession and improvement, followed by proper filing and continued good faith, shall determine the preference right to purchase. And also where improvements have already been made prior to the passage of this Act, division of the land claimed may be made by legal subdivisions, which shall conform as nearly as practicable with the subdivisions of land provided for in this Act, to include as near as may be the valuable improvements of the respective parties. The Government of the Philippine Islands is authorized to issue all needful rules and regulations for carrying into effect the provisions of this and preceding sections relating to mineral lands.

SEC. 58. (*As amended by act of Congress approved February 6, 1905.*) That whenever it shall be made to appear to the secretary of any province or the commander of any military department in the Philippine Islands that any lands within the province are saline in character, it shall be the duty of said provincial secretary or commander, under the regulations of the Government of the Philippine Islands, to take testimony in reference to such lands, to ascertain their true character, and to report the same to the Secretary of the Interior for the Philippine Islands; and if upon such testimony the Secretary of the Interior shall find that such lands are saline and incapable of being purchased under any of the laws relative to the public domain, then and in such case said lands shall be offered for sale at the office of the provincial secretary or such other officer as by the said Government may be described as mining recorder of the province or department in which the same shall be situated, as the case may be, under such regulations as may be prescribed by said Govern-

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ment, and sold to the highest bidder for cash at a price of not less than six pesos per hectare; and in case such lands fail to sell when so offered, then the same shall be subject to private sale at such office, for cash, at a price not less than six pesos per hectare, in the same manner as other lands in the said Islands are sold. All executive proclamations relating to the sales of public saline lands shall be published in only two newspapers, one printed in the English language and one in the Spanish language, at Manila, which shall be designated by said Secretary of the Interior.

SEC. 59. That no Act granting lands to provinces, districts, or municipalities to aid in the construction of roads, or for other public purposes, shall be so construed as to embrace mineral lands, which, in all cases, are reserved exclusively, unless otherwise specially provided in the act or acts making the grant.

SEC. 60. That nothing in this Act shall be construed to affect the rights of any person, partnership, or corporation having a valid, perfected mining concession granted prior to April eleventh, eighteen hundred and ninety-nine, but all such concessions shall be conducted under the provisions of the law in force at the time they were granted, subject at all times to cancellation by reason of illegality in the procedure by which they were obtained, or for failure to comply with the conditions prescribed as requisite to their retention in the laws under which they were granted: *Provided*, That the owner or owners of every such concession shall cause the corners made by its boundaries to be distinctly marked with permanent monuments within six months after this Act has been promulgated in the Philippine Islands, and that any concessions the boundaries of which are not so marked within this period shall be free and open to explorations and purchase under the provisions of this Act.

SEC. 61. That mining rights on public lands in the Philippine Islands shall, after the passage of this Act, be acquired only in accordance with its provisions.

SEC. 62. That all proceedings for the cancellation of perfected Spanish concessions shall be conducted in the courts of the Philippine Islands having jurisdiction of the subject-matter and of the parties, unless the United States Philippine Commission, or its successors, shall create special tribunals for the determination of such controversies.

AUTHORITY FOR THE PHILIPPINE ISLANDS GOVERNMENT TO PURCHASE LANDS OF RELIGIOUS ORDERS AND OTHERS AND ISSUE BONDS FOR PURCHASE PRICE.

SEC. 63. That the government of the Philippine Islands is hereby authorized, subject to the limitations and conditions prescribed in this Act, to acquire, receive, hold, maintain, and convey title to real and personal property, and may acquire real estate for public uses by the exercise of the right of eminent domain.

SEC. 64. That the powers hereinbefore conferred in section sixty-three may also be exercised in respect of any lands, easements, appurtenances, and hereditaments which, on the thirteenth of August, eighteen hundred and ninety-eight, were owned or held by associations, corporations, communities, religious orders, or private individuals in such large tracts or parcels and in such manner as in the opinion of the Commission injuriously to affect the peace and welfare of the people of the Philippine Islands. And for the purpose of providing funds to acquire the lands mentioned in this section said government of the Philippine Islands is hereby empowered to incur indebtedness, to borrow money, and to issue, and to sell at not less than par value, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands, upon such terms and conditions as it may deem best, registered or coupon bonds of said government for such amount as may be necessary, said bonds to be in denominations of fifty dollars or any multiple thereof, bearing interest at a rate not exceeding four and a half per centum per annum, payable quarterly, and to be payable at the pleasure of said government after dates named in said bonds not less than five nor more than thirty years from the date of their issue, together with interest thereon, in gold coin of the United States of the present standard value or the equivalent in value in money of said Islands; and said bonds shall be exempt from the payment of all taxes or duties of said government, or any local authority therein, or of the Government of the United States, as well as from taxation in any form by or under State, municipal, or local authority in the United States or the Philippine Islands. The moneys which may be realized or received from the issue and sale of said bonds shall be applied by the government of the Philippine Islands to the acquisition of the property authorized by this section, and to no other purposes.

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SEC. 65. That all lands acquired by virtue of the preceding section shall constitute a part and portion of the public property of the government of the Philippine Islands, and may be held, sold, and conveyed, or leased temporarily for a period not exceeding three years after their acquisition by said government on such terms and conditions as it may prescribe, subject to the limitations and conditions provided for in this Act: *Provided*, That all deferred payments and the interest thereon shall be payable in the money prescribed for the payment of principal and interest of the bonds authorized to be issued in payment of said lands by the preceding section and said deferred payments shall bear interest at the rate borne by the bonds. All moneys realized or received from sales or other disposition of said lands or by reason thereof shall constitute a trust fund for the payment of principal and interest of said bonds, and also constitute a sinking fund for the payment of said bonds at their maturity. Actual settlers and occupants at the time said lands are acquired by the government shall have the preference over all others to lease, purchase, or acquire their holdings within such reasonable time as may be determined by said government.

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SEC. 75. That no corporation shall be authorized to conduct the business of buying and selling real estate or be permitted to hold or own real estate except such as may be reasonably necessary to enable it to carry out the purposes for which it is created, and every corporation authorized to engage in agriculture shall by its charter be restricted to the ownership and control of not to exceed one thousand and twenty-four hectares of land; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining. Corporations, however, may loan funds upon real estate security and purchase real estate when necessary for the collection of loans, but they shall dispose of real estate so obtained within five years after receiving the title. Corporations not organized in the Philippine Islands, and doing business therein, shall be bound by the provisions of this section so far as they are applicable.

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ACTS OF THE PHILIPPINE COMMISSION.

The Public Land Act, No. 926, as amended by Acts Nos. 979, 1573, and 1699; and resolutions of the Philippine Commission extending the application of said act to territory theretofore excluded.

AN ACT Prescribing rules and regulations governing the homesteading, selling, and leasing of portions of the public domain of the Philippine Islands, prescribing terms and conditions to enable persons to perfect their titles to public lands in said islands, providing for the issuance of patents without compensation to certain native settlers upon the public lands, providing for the establishment of town sites and sale of lots therein, and providing for a hearing and decision by the Court of Land Registration of all applications for the completion and confirmation of all imperfect and incomplete Spanish concessions and grants in said islands, as authorized by sections thirteen, fourteen, and fifteen of the Act of Congress of July first, nineteen hundred and two, entitled "An act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

CHAPTER I.

HOMESTEADS ON THE PUBLIC DOMAIN.

SECTION 1. Any citizen of the Philippine Islands, or of the United States, or of any Insular possession thereof, over the age of twenty-one years or the head of a family, may, as hereinafter provided, enter a homestead of not exceeding sixteen hectares of unoccupied, unreserved, unappropriated agricultural public land in the Philippine Islands, as defined by the Act of Congress of July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," which shall be taken, if on surveyed lands, by legal subdivisions, but if on unsurveyed lands, shall be located in a body which shall be as nearly as practicable rectangular in shape and not more than eight hundred meters in length; but no person who is the owner of more than sixteen hectares of land in said Islands or who has had the benefits of any gratuitous allotment of sixteen hectares of land since the acquisition of the Islands by the United States, shall be entitled to the benefits of this chapter.

SEC. 2. Any person applying to enter land under the provisions of this chapter shall file with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands, an application under oath showing that he has the qualifications required under section one of this chapter, and that he possesses none of the disqualifications there mentioned; that such application is made for his exclusive use and benefit; that the same is made for the purpose of actual settlement and cultivation, and not, either directly or indirectly, for the use or benefit of any other person, persons, corporation, or association of persons; that the land applied for is nonmineral, does not contain valuable deposits of coal or salts, is more valuable for agricultural than forestry purposes, and is not occupied by any other person; and showing the location of the land by stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any. Upon the filing of said application the Chief of the Bureau of Public Lands shall summarily determine, by inquiry of the Chief of the the Bureau of Forestry and from the available land records, whether the land described is prima facie subject under the law to homestead settlement, and, if he shall find nothing to the contrary, the applicant, upon the payment of ten pesos, Philippine currency, shall be permitted to enter the quantity of land specified.

SEC. 3. No certificate shall be given or patent issued for the land applied for until the expiration of five years from the date of the filing of the application; and if, at the expiration of such time or at any time within three years thereafter.

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the person filing such application shall prove by two credible witnesses that he has resided upon and cultivated the land for the term of five years immediately succeeding the time of filing the application aforesaid, and shall make affidavit that no part of said land has been alienated or encumbered, and that he has borne true allegiance to the Government of the United States and that of the Philippine Islands, then, upon payment of a fee of ten pesos, Philippine currency, to such officer as may be designated by law as local land officer, or in case there be no such officer then to the Chief of the Bureau of Public Lands, he shall be entitled to a patent: *Provided, however*, That in the event of the death of an applicant prior to the issuance of a patent, his widow shall be entitled to have a patent for the land applied for issue to her upon showing that she has consummated the requirements of law for homesteading the lands as above set out; and in case the applicant dies before the issuance of the patent and does not leave a widow, then the interest of the applicant in the land shall descend and patent shall issue to the persons who under the laws of the Philippine Islands would have taken had the title been perfected by patent before the death of the applicant, upon proof by the persons thus entitled of compliance with said requirements and conditions.

SEC. 4. No lands acquired under the provisions of this chapter shall in any event become liable to the satisfaction of any debt contracted prior to the issuance of a patent therefor.

SEC. 5. If, at any time after the filing of the application as hereinabove provided and before the expiration of the period allowed by law for the making of final proof, it is proved to the satisfaction of the Chief of the Bureau of Public Lands, after due notice to the homesteader, that the land entered is not under the law subject to homestead entry, or that the homesteader has actually changed his residence, voluntarily abandoned the land for more than six months at any one time during the five years of residence herein required, or has otherwise failed to comply with the requirements of law, then in that event the Chief of the Bureau of Public Lands may cancel the entry, subject to appeal under proper regulations to the Secretary of the Interior, and the land thereupon shall become subject to disposition as other public lands of like character.

SEC. 6. Not more than one homestead entry shall be allowed to any one person.

SEC. 7. Before final proof shall be submitted by any person claiming to have complied with the provisions of this chapter, due notice, as prescribed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior, shall be given to the public of his intention to make such proof, stating therein the time and place, and giving a description of the land and the names of the witnesses by whom it is expected that the necessary facts will be established.

SEC. 8. Any person may file an affidavit of contest against any homestead entry, charging that the land entered was not unoccupied, unreserved, or unappropriated agricultural land at the time of filing the application, alleging disqualification of the entryman, noncompliance with law as to residence or cultivation, or any other matter which, if proven, would be just cause for the cancellation of the entry, and upon successful termination of the contest, the contestant, if a qualified entryman, shall be allowed a preference right of entry for sixty days from said date.

The Chief of the Bureau of Public Lands or any public official becoming aware of the existence of any of the grounds above stated, for impeaching or canceling the entry, may file formal complaint against the entry on any such ground, which, if proven, shall cause the cancellation of the entry.

SEC. 9. No patent shall issue under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof, the cost of which survey shall be borne by the Insular Government.

CHAPTER II.

SALES OF PORTIONS OF THE PUBLIC DOMAIN.

SEC. 10. Any citizen of the Philippine Islands, or of the United States or of any insular possession thereof, or any corporation or like association of persons organized under the laws of the Philippine Islands or of the United States or any State, Territory, or insular possession thereof, and authorized to transact business in the Philippine Islands, may purchase any tract of unoccupied,

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unappropriated, and unreserved nonmineral agricultural public land in the Philippine Islands, as defined in the Act of Congress of July first, nineteen hundred and two, not to exceed sixteen hectares for an individual or one thousand and twenty-four hectares for a corporation or like association, by proceeding as hereinafter provided in this chapter: *Provided*, That no association of persons not organized as above and no mere partnership shall be entitled to purchase a greater quantity than will equal sixteen hectares for each member thereof.

SEC. 11. Purchases, made under the provisions of this chapter of land previously surveyed, must be made of contiguous legal subdivisions. All lands purchased hereunder, whether previously surveyed or not, in case the tract sought to be purchased exceeds sixty-four hectares in area, must be taken, wherever possible, in the form of contiguous squares which shall contain at least sixty-four hectares each: *Provided*, That in connection with the purchase of lands in one or more tracts of sixty-four hectares there may be purchased one rectangular tract of thirty-two hectares, the longer side of which must be contiguous to the square tract of sixty-four hectares, or to one of such tracts if more than one be purchased. In no case may lands purchased under the provisions of this chapter be taken in such manner as to gain any such control of any adjacent land, water, stream, shore line, way, roadstead, or other valuable right as might be prejudicial to the interests of the public.

SEC. 12. An application to purchase land under this chapter must be filed with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands. It must be executed under oath and must state the citizenship of the applicant and his post-office address; the location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as can be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; a statement as to whether any part of the land is occupied or improved, and that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain deposits of coal or salts. The application of a corporation must be accompanied by a certified copy of its charter or articles of incorporation. An unincorporated association must show that its members are severally possessed of the qualifications above required of individuals. In the case of a corporation or association organized outside of the Philippine Islands there must be attached to the application proper documentary evidence that the law governing the transaction of business in the Philippine Islands by foreign corporations or associations has been complied with.

SEC. 13. It shall be the duty of the Chief of the Bureau of Public Lands to examine all applications to purchase under this chapter, and to determine whether the applicant has the qualifications required in section ten thereof, and from the certificate of the Chief of the Bureau of Forestry to determine whether the land applied for is more valuable for agricultural than forestry purposes. He shall report his findings to the Secretary of the Interior, who, after proper consideration and approval of same, shall order the sale to be made.

It shall also be the duty of the Chief of the Bureau of Public Lands to appraise the land applied for under this chapter, which appraisement shall not be less than ten pesos, Philippine currency, per hectare, and in making this appraisal he may call to his assistance any provincial or municipal official of the province in which the land lies. When the land shall have been appraised, as hereinabove provided, the Chief of the Bureau of Public Lands shall advertise the same for sale by publishing a notice thereof once a week for six consecutive weeks, in two newspapers, one published at Manila and the other (if any such there be) published near the land applied for, such notices to be published in both the English and Spanish languages. The Chief of the Bureau of Public Lands shall, with the approval of the Secretary of the Interior, prescribe, in addition to the publication in newspapers, a suitable method of posting notice upon the land sought to be purchased or in the pueblo where the land is situated. The notices shall state a date not earlier than ten days after the date of the last publication of the notice in the newspaper published at Manila, upon which date the Chief of the Bureau of Public Lands will award the land to the highest bidder, or will call for new bids, or otherwise proceed as provided by law.

SEC. 14. All bids must be sealed and addressed to the Chief of the Bureau of Public Lands, and must have inclosed therewith a certified check or a post-office money order payable to his order, for twenty-five per centum of the amount of the bid, which amount shall be retained, in case the bid is accepted,

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as part payment of the purchase price: *Provided*, That no bids shall be considered which are for less than the appraised value of the land.

SEC. 15. Upon the opening of the bids the land shall be awarded to the highest bidder. If there are two or more bidders which are higher than other bidders and are equal, and one of such higher and equal bids is the bid of the applicant, his bid shall be accepted. If, however, the bid of the applicant is not one of such equal and higher bids, then the Chief of the Bureau of Public Lands shall at once submit the lands for public bidding, and to the person making the highest bid on such public auction the land shall be awarded, but no bid received at such public auction shall be finally accepted until the bidder shall have deposited twenty-five per centum of his bid, as required in section fourteen. The deposits of all unsuccessful bidders shall be returned at once by the Chief of the Bureau of Public Lands. The Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, shall have authority to reject any and all bids hereunder.

SEC. 16. Land sold under the provisions of this chapter must be paid for in the following manner: The balance of the purchase price after deducting the amount paid by check or post-office money order at the time of submitting the bid, may be paid in full upon the making of the award, or may be paid in equal annual installments, or may be paid in one installment at the expiration of five years from the date of the award. All sums remaining unpaid after date of the award shall bear six per centum interest per annum from such date until paid.

SEC. 17. No patent shall issue under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof. The cost of such survey must be borne by the purchaser, if a corporation or like association, and if the survey be made in advance of the regular surveys of the Islands; but where the purchaser is an individual the cost of the survey shall be borne by the Insular Government. Patents shall not issue until after the expiration of five years from the date of the award, and before the same shall issue the purchaser must show actual occupancy, cultivation, and improvement of the premises for a period of five years immediately succeeding the date of the award, and that he has not sold the land or in any manner encumbered the title.

SEC. 18. If at any time after the date of the award and before the issuance of patent, it is proven to the satisfaction of the Chief of the Bureau of Public Lands, after due notice to the purchaser, that the purchaser has voluntarily abandoned the land for more than one year at any one time, or has otherwise failed to comply with the requirements of the law, then the land shall revert to the Government and all prior payments of purchase money shall be forfeited.

SEC. 19. This chapter shall be held to authorize only one purchase of the maximum amount of land hereunder by the same person, or by the same corporation or association of persons; and no corporation or association, any member of which shall have taken the benefits of this chapter, either as an individual or as a member of any other corporation or association, shall purchase any other public lands under this chapter.

SEC. 20. In the event of the death of an individual applicant subsequent to the date of the filing of the application and prior to the issuance of patent, the distributees of his estate, as defined by law, may claim the privilege of being subrogated to the rights of the deceased applicant, and if they consummate the requirements of law for purchasing land hereunder, patent shall issue to such distributees.

SEC. 21. If any land applied for under the provisions of this chapter shall be actually occupied by any person who is qualified to make a homestead or other entry under the public-land laws of the Philippine Islands, or by any native who is entitled by law to a free patent, such person shall be personally served with notice as to his rights, and shall be allowed a preference right of one hundred and twenty days within which to make entry or apply for patent.

CHAPTER III.

LEASES OF PORTIONS OF THE PUBLIC DOMAIN.

SEC. 22. Any citizen of the United States, or of the Philippine Islands, or of any insular possession of the United States, or any corporation or association of persons organized under the laws of the Philippine Islands or of the United States or of any State, Territory, or insular possession thereof, authorized by

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the laws of its creation and by the laws of the Philippine Islands and the Acts of Congress applicable thereto to transact business in the Philippine Islands, may lease any tract of unoccupied, unreserved, nonmineral agricultural public lands, as defined by sections eighteen and twenty of the Act of Congress approved July first, nineteen hundred and two, providing a temporary government for the Philippine Islands, and so forth, not exceeding one thousand and twenty-four hectares, by proceeding as hereinafter in this chapter indicated: *Provided*, That no lease shall be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claim shall be legally extinguished: *And provided further*, That no corporation or association of persons shall be permitted to lease lands hereunder which are not reasonably necessary to enable it to carry on the business for which it was lawfully created and which it may lawfully pursue in the Philippine Islands.

SEC. 23. Leases made under the provisions of this chapter, of land previously surveyed, must be made of contiguous legal subdivisions. All lands leased hereunder, whether previously surveyed or not, in case the tract sought to be leased exceeds sixty-four hectares in area, must be taken, where possible, in the form of contiguous squares which shall contain at least sixty-four hectares each: *Provided*, That in connection with the lease of lands in one or more tracts of sixty-four hectares there may be leased one rectangular tract of thirty-two hectares, the longer side of which must be contiguous to the square tract of sixty-four hectares, or to one of such tracts if more than one be leased. In no case may lands leased under the provisions of this chapter be taken so as to gain a control of adjacent land, water, stream, shore line, way, roadstead, or other valuable right which in the opinion of the Chief of the Bureau of Public Lands would be prejudicial to the interests of the public.

SEC. 24. An application to lease land under this chapter must be executed under oath and filed with such officer as may be designated by law as local land officer of the district in which the land is situated, or in case there be no such officer then with the Chief of the Bureau of Public Lands, and must show the following facts: The citizenship and post-office address of the applicant; the location of the land, showing the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; a statement as to whether the land contains any improvements or evidences of settlement and cultivation, and a statement that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain deposits of coal or salts. Corporations and associations shall be required to file evidence of their legal existence and authority to transact business in the Philippine Islands.

SEC. 25. All applicants for leases under the terms of this chapter must give notice, by publication and by such other means as may be required by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, of intent to make application to lease the tract in question, which notice shall state the date when the application will be presented and shall describe as definitely as practicable the land sought to be leased.

SEC. 26. It shall be the duty of the Chief of the Bureau of Public Lands to examine all applications for leases under this chapter, and to determine whether the applicant has the qualifications required in section twenty-two hereof, and, from the certificate of the Chief of the Bureau of Forestry, to determine whether the land applied for is more valuable for agricultural than forestry purposes, and further summarily to determine from available records whether the land is nonmineral and does not contain deposits of coal or salts. He shall report his findings to the Secretary of the Interior, who, after proper consideration and approval of same, shall cause the lease to be executed.

SEC. 27. The rate per hectare per annum for lands leased under this chapter shall be fixed by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, and shall in no case be less than fifty centavos, Philippine currency, per hectare per annum; said rent shall be paid yearly in advance, the first payment being deposited with the Chief of the Bureau of Public Lands before the delivery of the lease.

SEC. 28. Leases hereunder shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years, at a rate to be fixed as above indicated, which rate shall not be less than fifty centavos per hectare and shall not exceed one peso and fifty centavos, Philippine cur-

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rency, per hectare. Land leased hereunder shall not be assigned or sublet without the consent of the Chief of the Bureau of Public Lands and the Secretary of the Interior.

SEC. 29. No land shall be leased under the provisions of this chapter until the land has been surveyed under the direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof, the cost of survey to be borne by the lessee.

SEC. 30. The lease of any lands under this chapter shall not confer the right to remove or dispose of any valuable timber except as provided in regulations of the Bureau of Forestry for cutting timber upon such lands. Nor shall such lease confer the right to remove or dispose of stone, oil, coal, salts, or other minerals, but the lease as to the part thereof which shall be mineral may be canceled by the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, whenever the mineral character of such part shall be made satisfactorily to appear, after due notice to the lessee.

SEC. 31. The commission of waste or the violation of the forestry regulations by the lessee shall work a forfeiture of his last payment of rent and render him liable to immediate dispossession and suit for damage.

CHAPTER IV.

FREE PATENTS TO NATIVE SETTLERS.

SEC. 32. Any native of the Philippine Islands now an occupant and cultivator of unreserved, unappropriated agricultural public land, as defined by the Act of Congress of July first, nineteen hundred and two, who has continuously occupied and cultivated such land, either by himself or through his ancestors, since August first, eighteen hundred and ninety-eight; or who, prior to August first, eighteen hundred and ninety-eight, continuously occupied and cultivated such land for three years immediately prior to said date, and who has been continuously since July fourth, nineteen hundred and two, until the date of the taking effect of this Act, an occupier and cultivator of such land, shall be entitled to have a patent issued to him without compensation for such tract of land, not exceeding sixteen hectares, as hereinafter in this chapter provided.

SEC. 33. Any person desiring to obtain the benefits of this chapter must, prior to January first, nineteen hundred and seven,[a] file an application for a patent with such officer as may be designated by law as local land officer, or in case there be no such officer then with the Chief of the Bureau of Public Lands. Said application must be executed under oath, and must show the following facts: The name, age, and post-office address of the applicant; that he is a native of the Philippine Islands; the location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if any; that the land is not claimed or occupied by any other person; a statement as to the date when the applicant or his ancestor, giving the name of ancestor and stating his relationship to the applicant, entered into occupation and began cultivation, and a description of the improvements which have been made. If the first occupation and cultivation is claimed through an ancestor, the applicat must show the name of such ancestor and file satisfactory evidence of the date and place of his death and burial, in which case the patent shall issue in the name of the heir or heirs of such ancestor as defined by the laws of the Philippine Islands.

SEC. 34. Upon receipt of said application it shall be the duty of the Chief of the Bureau of Public Lands to cause a careful investigation to be made in such manner as he shall deem necessary for the ascertainment of the truth of the allegations therein contained, and if satisfied upon such investigation that the applicant comes within the provisions of this chapter, he shall cause a patent to issue for the tract to such applicant, or to the heirs of his ancestor, as provided in the next preceding section, not exceeding sixteen hectares in extent: *Provided*, That no application shall be finally acted upon until notice thereof has been published in the municipality and barrio in which the land is located, and

[a] Act No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909. See page 478.

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adverse claimants have had opportunity to present their claims: *And provided further*, That no patent shall issue until the land has been surveyed under direction of the Chief of the Bureau of Public Lands and an accurate plat made thereof.

SEC. 35. Lands acquired under the provisions of this chapter shall be inalienable and shall not be subject to incumbrance for a period of seven years from the date of the issuance of the patent therefor, and shall not be liable for the satisfaction of any debt contracted prior to the expiration of that period.

CHAPTER V.

TOWN SITES.

SEC. 36. Whenever in the opinion of the Secretary of the Interior it shall be in the public interest to reserve a town site from the public land or to acquire lands for such purpose by the exercise of the right of eminent domain, he shall direct the Chief of the Bureau of Public Lands to have made a survey of the exterior boundaries of the land which he deems it wise so to reserve or acquire.

SEC. 37. Upon the completion and return of the survey mentioned in section thirty-six, the Secretary of the Interior shall forward the same to the Philippine Commission with his recommendations.

SEC. 38. The Commission, if it approves the recommendations of the Secretary of the Interior, shall pass a resolution reserving the land surveyed, or such part thereof as it may deem wise, as a town site, and a certified copy of such resolution shall be sent to the Chief of the Bureau of Public Lands who shall record the same in the records of his office and forward a certified copy of such record to the registrar of the province in which the surveyed land lies.

SEC. 39. It shall then be the duty of the Chief of the Bureau of Public Lands, having recorded the resolution of the Commission and the preliminary survey accompanying the same, to direct a subdivision and plat of the land, in accordance with the directions contained in the resolution approving the same, if such resolution contain directions as to the method of subdivision, or, if it contain no such direction, then in a manner which shall to the Chief of the Bureau of Public Lands seem best adapted to the convenience and interest of the public and the residents of the future town.

SEC. 40. The Commission, by resolution, or in the absence of action in this regard by the Commission, the Chief of the Bureau of Public Lands, shall reserve from the land to be plotted, lots of sufficient size and convenient situation for public uses, as well as the necessary avenues, streets, alleys, parks, and plazas.

SEC. 41. The plat of the subdivision shall designate certain lots as business lots and the remainder as residence lots, and shall also reserve and note the lots of land owned by private individuals as evidenced by record titles, or as possessed and claimed by them as private property: *Provided, however*, That the avenues, streets, alleys, parks, plazas, and lots shall be laid out on the plat as though the lands owned or claimed by private persons were part of the public domain and part of the reservation, with a view to the possible subsequent purchase or condemnation thereof, if deemed necessary by the proper authorities.

SEC. 42. All lots, whether public or private, contained in the exterior boundaries shall be plotted and numbered upon a general plan or system.

SEC. 43. The plat of the subdivision of the reserved town site thus prepared under the supervision of the Chief of the Bureau of Public Lands shall be submitted to the Secretary of the Interior for presentation to the Commission for its consideration, modification, amendment, or approval.

SEC. 44. The resolution of the Commission approving the plat shall provide whether the proceeds derived from the sale of lots shall be covered into the Insular Treasury as general Insular funds, or as a special fund to be devoted to public improvements in or near the town site, and thereafter the receipts from the sale of lots shall be applied as provided in the resolution of the Commission.

SEC. 45. Where the proceeds of the sale are to constitute a fund to be devoted to public improvements in or near the town site, the same shall be expended as provided by law or resolution of the Commission.

SEC. 46. When the plat of subdivision is approved by the Commission it shall be certified to the Chief of the Bureau of Public Lands, together with the

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resolution approving the same, and the Chief of the Bureau of Public Lands shall record the same in the records of his office and shall forward a certified copy of such record to the registrar of the province in which the land lies, to be by such registrar recorded in the records of his office.

SEC. 47. All lots except those claimed by or belonging to private owners and claimants and excepting such lots and tracts as may be reserved for parks, public buildings, and other public uses, shall be sold under the direction of the Chief of the Bureau of Public Lands, as hereinafter in this chapter provided, and the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, shall prescribe rules and regulations for the disposal of lots hereunder.

SEC. 48. All lots in the reservation which are subject to sale as above provided, shall, if in the opinion of the Secretary of the Interior the value of the lots is sufficiently known to make an appraisement useful, be appraised by a committee to be appointed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior.

SEC. 49. The lots in any such town site thus established and subject to sale, shall, after the approval and recording of the plat of subdivision as above provided, and after due advertisement, be sold at public auction to the highest bidder; but no bid shall be accepted, in case of appraised lots, if the bid does not equal two-thirds of the appraised value, and in the case of lots not appraised the bid shall not be accepted if in the judgment of the Chief of the Bureau of Public Lands and the Secretary of the Interior the bid is an inadequate price for the lot.

SEC. 50. Not more than two residence lots and two business lots in any one town site shall be sold to any one person, corporation, or association without the specific approval of the Secretary of the Interior.

SEC. 51. Lots which have been offered for sale in the manner herein prescribed, and for which no satisfactory bid has been received, shall be again offered for sale after due advertisement, and if at the second sale no satisfactory bid is received, they may be sold at private sale by the Chief of the Bureau of Public Lands for not less than their value, as appraised by a committee to be appointed by the Chief of the Bureau of Public Lands with the approval of the Secretary of the Interior.

SEC. 52. In any case in which, in the opinion of the Commission, it shall be necessary to condemn private lands within the reserved or proposed limits of a town site, either for streets, alleys, parks, or as lots for public buildings or other public uses, the Commission shall pass a resolution declaring the necessity for the same, which resolution shall be certified to the Attorney-General, who shall at once begin proceedings for the condemnation of the lands described in the resolution, in accordance with the provisions of the Code of Civil Procedure.

SEC. 53. Town sites constituted under the provisions of this chapter on land forming a part of an existing municipality shall remain within the jurisdiction of such municipality until taken therefrom by legislative action of the Commission.

CHAPTER VI.

UNPERFECTED TITLES AND SPANISH GRANTS AND CONCESSIONS.

SEC. 54. The following-described persons or their legal successors in right, occupying public lands in the Philippine Islands, or claiming to own any such lands or an interest therein, but whose titles to such lands have not been perfected, may apply to the Court of Land Registration of the Philippine Islands for confirmation of their claims and the issuance of a certificate of title therefor, to wit:

1. All persons who prior to the transfer of sovereignty from Spain to the United States had fulfilled all the conditions required by the Spanish laws and royal decrees of the Kingdom of Spain for the purchase of public lands, including the payment of the purchase price, but who failed to secure formal conveyance of title;

2. All persons who prior to the transfer of sovereignty from Spain to the United States, having applied for the purchase of public lands and having secured a survey, auction, and an award, or a right to an award, of such lands, did not receive title therefor through no fault upon their part;

3. All persons who prior to the transfer of sovereignty from Spain to the United States, having applied for the purchase of public lands and having

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secured a survey and award of same, did not, through negligence upon their part, comply with the conditions of full or any payment therefor, but who after such survey and award shall have occupied the land adversely, except as prevented by war or *force majeure*, until the taking effect of this Act;

4. All persons who were entitled to apply and did apply for adjustment or composition of title to lands against the Government under the Spanish laws and royal decrees in force prior to the royal decree of February thirteenth, eighteen hundred and ninety-four, but who failed to receive title therefor through no default upon their part;

5. All persons who were entitled to a gratuitous title to public lands by "possessory proceedings" under the provisions of articles nineteen and twenty of the royal decree of the King of Spain issued February thirteenth, eighteen hundred and ninety-four, and who, having complied with all the conditions therein required, failed to receive title therefor through no default upon their part; and

6. All persons who by themselves or their predecessors in interest have been in the open, continuous, exclusive, and notorious possession and occupation of agricultural public lands, as defined by said Act of Congress of July first, nineteen hundred and two, under a bona fide claim of ownership except as against the Government, for a period of ten years next preceding the taking effect of this Act, except when prevented by war or *force majeure*, shall be conclusively presumed to have performed all the conditions essential to a Government grant and to have received the same, and shall be entitled to a certificate of title to such land under the provisions of this chapter.

All applicants for lands under paragraphs one, two, three, four, and five of this section must establish by proper official records or documents that such proceedings as are therein required were taken and the necessary conditions complied with: *Provided, however*, That such requirements shall not apply to the fact of adverse possession.

SEC. 55. All persons claiming title to Government lands not coming within the classes specified in the preceding section are excluded from the benefits of this chapter.

SEC. 56. Any person or persons, or their legal representatives or successors in right, claiming any lands or interest in lands in the Philippine Islands, under the provisions of this chapter, and who now desire or claim the right to have such title perfected, must in every case present an application in writing to the Court of Land Registration praying that the validity of the alleged title or claim be inquired into and that a certificate of title issue to them under the provisions of the Land Registration Act for the lands claimed.

SEC. 57. Such claims and applications shall conform as nearly as may be in their material allegations to the requirements of an application for registration under the provisions of section twenty-one and subsequent sections of the Land Registration Act, and shall be accompanied by a plan of the land and all documents evidencing a right on the part of the applicant to the lands claimed. The application shall also set forth fully the nature of the claim to the land, and when based upon proceedings initiated under Spanish laws shall particularly state the date and form of the grant, concession, warrant, or order of survey under which the claim is made; by whom such grant, concession, warrant, or order of survey was made; the extent of the compliance with the conditions required by the Spanish laws and royal decrees for the acquisition of legal title, and if not fully complied with the reason for such noncompliance, together with a statement of the length of time such land or any portion thereof has been actually occupied by the claimant and his predecessors in interest; the use made of the land, and the nature of the inclosure, if any. The fees provided to be paid for the registration of lands under the Land Registration Act shall be collected from applicants under this chapter, except that upon the original registration of land claimed hereunder no fee shall be required for the assurance fund.

SEC. 58. Any applicant for registration of lands under the provisions of this chapter may, upon petition directed to the Chief of the Bureau of Public Lands, and upon payment of the fees as regulated by law, secure a survey and plan of the lands claimed to be owned by him, which said plan shall be filed with his application in the Court of Land Registration.

SEC. 59. (*As amended by Act No. 1699.*) Upon the filing of claims and applications for registration in the Court of Land Registration, under this chapter, the same procedure shall be adopted in the hearing of such cases and in the matter of appeal as is by the Land Registration Act provided for other claims.

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except that a notice of all such applications, together with a plan of the lands claimed, shall be immediately forwarded to the Director of Lands, who shall be represented in all questions arising upon the consideration of such applications by the Attorney-General or by any subordinate or assistant to the Attorney-General appointed for that purpose: *Provided*, That prior to the publication for hearing, all of the papers in such case shall be transmitted by the clerk to the Attorney-General in order that he may, if he considers it advisable for the interests of the Government, investigate all of the facts alleged in the application or otherwise brought to his attenion. The Attorney-General shall return such papers to the clerk as soon as practicable within three months.

SEC. 60. It shall be the duty of the examiner of titles, upon reference to him of any such claim or application, to investigate all the facts alleged therein or otherwise brought to his attention, and to make careful inquiry as to the period of occupation of the land by the claimant or his predecessors in interest; the nature of such lands; the character of the inclosure, if any, and the extent to which the land has been subjected to cultivation. He shall file a full report of his investigation in the case, concluding with a certificate of his opinion upon the merits of the claim.

SEC. 61. It shall be lawful for the Chief of the Bureau of Public Lands, whenever in the opinion of the Chief Executive the public interest shall require it, to cause to be filed in the Court of Land Registration, through the Attorney-General, a petition against the holder, claimant, possessor, or occupant of any land in the Philippine Islands who shall not have voluntarily come in under the provisions of this chapter or the Land Registration Act, stating in substance that the title of such holder, claimant, possessor, or occupant is open to question, or stating in substance that the boundaries of any such land which has not been brought into court as aforesaid are open to question, and praying that the title to any such land or the boundaries thereof or the right to occupancy thereof be settled and adjudicated. Such petition shall contain all the data essential to furnish a full notice thereof to the occupant of such land and to all persons who may claim an adverse interest therein, and shall be accompanied by a plan of the land in question. The court shall cause service of notice to be made as in other cases, and shall proceed to hear, try, and determine the questions stated in such petition or arising in the matter, and settle and determine the ownership of the land and cause certificate of title to be issued therefor, as in other cases filed under this chapter.

SEC. 62. Whenever any lands in the Philippine Islands are set apart as town sites, under the provisions of Chapter Five of this Act, it shall be lawful for the Chief of the Bureau of Public Lands, with the approval of the Secretary of the Interior, to notify the judge of the Court of Land Registration that such lands have been reserved as a town site and that all private lands or interests therein within the limits described ought forthwith to be brought within the operation of the Land Registration Act, and to become registered land within the meaning of said Registration Act. It shall be the duty of the judge of said court to issue a notice thereof, stating that claims for all private lands or interests therein within the limits described must be presented for registration under the Land Registration Act in the manner provided in Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for militiary reservations, and all lands desired to be purchased by the Government of the United States for military purposes." The procedure for the purpose of this section and the legal effects thereof shall thereupon be in all respects as provided in sections three, four, five, and six of said Act Numbered Six hundred and twenty-seven.

SEC. 63. All proceedings under this chapter involving title to or interest in land shall be conducted and considered as an application for registration of such land, and the final decree of the court shall in every case be the basis for the original certificate of title in favor of the person entitled to the property under the procedure prescribed in section forty-one of the Land Registration Act.

SEC. 64. If in the hearing of any application arising under this chapter the court shall find that more than one person or claimant has an interest in the land, such conflicting interests shall be adjudicated by the court and decree awarded in favor of the person or persons entitled to the land, according to the laws of the Philippine Islands, except that where the action is voluntarily dismissed by the parties interested the order of the court shall be merely one of dismissal without affecting title.

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SEC. 65. Whenever, in any proceedings under this chapter to secure registration of an incomplete or imperfect claim of title initiated prior to the transfer of sovereignty from Spain to the United States, it shall appear that had such claims been prosecuted to completion under the laws prevailing when instituted, and under the conditions of the grant then contemplated, the conveyance of such land to the applicant would not have been gratuitous but would have involved payment therefor to the Government, then and in that event the court shall, after decreeing in whom title should vest, further determine the amount to be paid as a condition for the registration of the land. Such judgment shall be certified to the Bureau of Public Lands by the clerk of the court for collection of the amount due from the person entitled to conveyance. Upon payment to the Chief of the Bureau of Public Lands of the price specified in the judgment, the case shall be returned by him to the Court of Land Registration with a notation of such payment, whereupon the registration of the land in favor of the party entitled thereto shall be ordered by the court. If the applicant shall fail to pay the amount of money required by the decree within a reasonable time after he receives notice thereof the court may order the proceeding to stand dismissed and the title to the land shall then be in the Government free from any claim of the applicant.

SEC. 66. Whenever any judgment of confirmation or other decree of the court involving public lands shall become final, the clerk of the court shall certify that fact to the Bureau of Public Lands, with a copy of the decree of confirmation or judgment of the court, which shall plainly state the location, boundaries, and area as nearly as may be, of the tract involved in the decree or judgment, and shall be accompanied by a plan of the land as confirmed or acted upon by the court. In the event the original survey was made by the Bureau of Public Lands and the decree of the court conforms thereto, no further proceedings shall be required. When the original survey was made by the applicant or where the tract confirmed by the court varies from the original survey as made by the Bureau of Public Lands, the Chief of the Bureau of Public Lands shall immediately cause the tract, so confirmed by the court, to be surveyed at the cost of the Insular Government, and shall, when such survey has been approved by him, furnish a copy of same to the Court of Land Registration and to the applicant, which survey when approved by the court, and unless objected to by the applicant within thirty days, shall be conclusively presumed to be correct. If objection is made to the survey by the applicant, the court, upon notice to the Bureau of Public Lands, shall hear such objections, and its action in the matter shall be final.

SEC. 67. No title to, or right or equity in, any public lands in the Philippine Islands may hereafter be acquired by prescription or by adverse possession or occupancy, or under or by virtue of any laws in effect prior to American occupation, except as expressly provided by laws enacted or provided since the acquisition of the Islands by the United States.

CHAPTER VII.

GENERAL PROVISIONS.

SEC. 68. The short title of this Act shall be "The Public Land Act."

SEC. 69. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions, consistent with this Act, as may be necessary and proper to carry into effect all the provisions thereof that are to be administered by or under the direction of the Bureau of Public Lands, and for the conduct of all proceedings arising under such provisions.

SEC. 70. While title to public lands in the Philippine Islands remains in the Government, the Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall be charged with the immediate executive control of the survey, classification, lease, sale, and other disposition and management thereof, and the decisions of the Bureau as to questions of facts relating to such lands shall be conclusive when approved by the Secretary of the Interior.

SEC. 71. The Civil Governor, for reasons of public policy, may, from time to time, by proclamation, designate any tract or tracts of public lands in the Philippine Islands as nonalienable, and thereafter the same shall be withdrawn from settlement, entry, sale, or other disposition under any of the public-land laws of the Islands until again made subject thereto by law of the Islands.

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SEC. 72. Provincial secretaries and all other persons that may be designated as mining recorders shall, in their capacities as such recorders, be subject to the supervision of the Chief of the Bureau of Public Lands.

SEC. 73. All patents or certificates for lands disposed of under this law shall be prepared in the Bureau of Public Lands and shall issue in the name of the United States and the Philippine Government under the signature of the Civil Governor; but such patents or certificates shall be effective only for the purposes defined in section one hundred and twenty-two of the Land Registration Act, and the actual conveyance of the land shall be effected only as provided in said section.

SEC. 74. All persons receiving title to Government lands under the provisions of this Act, shall hold such lands subject to the same public servitudes as existed upon lands owned by private persons under the sovereignty of Spain, including those with reference to the littoral of the sea and the banks of navigable rivers or rivers upon which rafting may be done.

SEC. 75. The beneficial use of water shall be the basis, the measure, and the limit of all rights thereto in said Islands, and the patents herein granted shall be subject to the right of the Government of these Islands to make such rules and regulations for the use of water and the protection of the water supply, and for other public purposes, as it may deem best for the public good. Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and decisions of the courts, the possessors and owners of such vested rights shall be maintained and protected in the same, and all patents granted under this Act shall be subject to any vested and accrued rights to ditches and reservoirs used in connection with such water rights as may have been acquired in the manner above described prior to April eleventh, eighteen hundred and ninety-nine.

SEC. 76. There is hereby reserved from the operation of all patents, certificates, entries, and grants by the Insular Government authorized under this Act, the right to use for the purposes of power any flow of water in any stream running through or by the land granted, the convertible power from which at ordinary low water exceeds fifty horsepower. Where the convertible power in any stream running through or running by land granted under the authority of this Act thus exceeds fifty horsepower, and there is no means of using such power except by the occupation of a part of the land granted under authority of this Act, then so much land as is reasonably necessary for the mill site or site for the power house, and for a suitable dam and site for massing the water, is hereby excepted from such grant, not exceeding four hectares, and a right of way to the nearest public highway from the land thus excepted, and also a right of way for the construction and maintenance of such flumes, aqueducts, wires, poles, or other conduits as may be needed in conveying the water to the point where its fall will yield the greatest power, or the power from the point of conversion to the point of use, is reserved as a servitude or easement upon the land granted by authority of this Act: *Provided, however*, That when the Government or any concessionaire of the Government shall take possession of land under this section which a grantee under this Act shall have paid for, supposing it to be subject to grant under this Act, said grantee shall be entitled to indemnity from the Government or the concessionaire for the amount, if any, paid by him to the Government for the land taken from him by virtue of this section: *And provided further*, That with respect to the flow of water, except for converting the same into power exceeding fifty horsepower, said grantee shall be entitled to the same use of the water flowing through or along his land that other private owners enjoy by the laws of the Philippine Islands, subject to the governmental regulation provided in the previous section. Water power privileges in which the convertible power at ordinary low water shall exceed fifty horsepower shall be disposed of only upon terms to be embodied in a special Act of the Commission until a general law shall be passed concerning the use, lease, or acquisition of such water privilege.

SEC. 77. Any person who shall willfully and knowingly submit, or cause to be submitted, any false proof, or who shall make, or cause to be made, any false affidavit in support of any application or claim in any manner respecting the public lands of the Philippine Islands, shall be deemed guilty of perjury and punished accordingly.

SEC. 78. The provisions of this Act shall extend and apply to all provinces and places of the Philippine Archipelago except the Moro Province and the Provinces of Lepanto-Bontoc, Benguet, Paragua, and Nueva Vizcaya; but the

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provisions of this Act or of any chapter hereof may at any time, by resolution of the Philippine Commission, be extended over and put in force in any of the provinces or any part thereof hereby excepted from its operation.[a]

SEC. 79. When this Act shall have been approved by the President of the United States and shall have received the express or implied sanction of Congress, as provided by section thirteen of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," such facts shall be made known by the proclamation of the Civil Governor of the Islands, and this Act shall take effect on the date of such proclamation.

Enacted, October 7, 1903.

NOTE—

BY THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS.

A PROCLAMATION

Act Numbered Nine hundred and twenty-six, entitled "An Act prescribing rules and regulations governing the homesteading, selling, and leasing of portions of the public domain of the Philippine Islands, prescribing terms and conditions to enable persons to perfect their titles to public lands in said Islands, providing for the issuance of patents without compensation to certain native settlers upon the public lands, providing for the establishment of town sites and sale of lots therein, and providing for the determination by the Philippines Court of Land Registration of all proceedings for completion of imperfect titles and for the cancellation or confirmation of Spanish concessions and grants in said Islands, as authorized by sections thirteen, fourteen, fifteen, and sixty-two of the Act of Congress of July first, nineteen hundred and two, entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,'" having been approved by the President of the United States and by him transmitted to the Congress of the United States at the beginning of its last session, and the Congress of the United States having failed to either disapprove or amend the same at said session.

Now, therefore, I, Luke E. Wright, Civil Governor of the Philippine Islands, do hereby, pursuant to the provisions and requirements of section numbered seventy-nine of said Act Numbered Nine hundred and twenty-six, declare and proclaim that said Act is in full force and effect from this date.

In testimony whereof, I have hereunto set my hand and caused the seal of the Government of the Philippine Islands to be affixed.

Done at Manila, Philippine Islands, this twenty-sixth day of July, one thousand nine hundred and four.

LUKE E. WRIGHT,
Civil Governor.

By the Civil Governor:
F. W. CARPENTER,
Acting Executive Secretary.

Resolutions extending operation of the public land act.

The Philippine Commission has passed the following resolutions extending the application of the Public Land Act, or portions thereof, to certain territory, therein mentioned, which has heretofore been excepted from the operation of said law:

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 22, 1905.

"*Resolved*, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, ordinarily known as the Public Land Act:

"(1) Said Public Land Act in its entirety be extended over and put in force throughout the district of Zamboanga, in that portion of the district of Lanao not included in the basin of Lake Lanao, and in that portion of the district of Davao included in the municipalities of Mati, Baganga, Caraga, and Cateel;

"(2) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force throughout the entire district of Cotabato, with the exception of Cotabato Island, on which the town of Cotabato is located, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit;

[a] See Resolutions extending operations of the public land act, pages 475–476.

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"(3) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in Cotabato Island, on which the town of Cotabato is situated, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit;

"(4) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force in that portion of the district of Davao not included in the municipalities of Mati, Baganga, Caraga, and Cateel, with the exception of the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao;

"(5) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in the municipalities of Mati, Baganga, Caraga, and Cateel, and the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao;

"(6) That Chapter III of said Act, relating to leases of portions of the public domain, be extended over and put in force in the Island of Tawi Tawi, in the district of Sulu;

"(7) That Chapter I of said Act, relating to homesteads on the public domain, be extended over and put in force in the following areas of the district of Sulu:

"The land within a circle whose radius is a mile and a half from the center of the central point of the main landward gateway in the walls of the city of Jolo, the land within a circle whose radius is a mile and a half and whose center is the central point in the masonry fort in the town of Siasi, and all other portions of the district of Sulu for the time being exempted from the provisions of the land act.

"(8) That Chapter IV of said Act, relating to free patents to native settlers, in its entirety be extended over and put in force throughout the whole of the Moro Province; and

"That the legislative council of the Moro Province is directed to make known throughout the province the foregoing resolutions and particularly the limitations imposed by the Public Land Act as to the time within which native settlers may obtain free patents by virtue of Chapter IV of the Public Land Act."

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 22, 1905.

"The Acting President presented to the Commission the question of the extension of Act Numbered Nine hundred and twenty-six, known as 'The Public Land Act,' in its entirety, to the Province of Palawan, formerly called Paragua: After due consideration, it was, on motion,

"*Resolved*, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, ordinarily known as 'The Public Land Act,' the said Public Land Act, in its entirety, be immediately extended over and put in force throughout the entire Province of Palawan, formerly known as the Province of Paragua; and

"*Resolved further*, That the provincial board of the Province of Palawan is directed to make known the contents of the foregoing resolution, so far as practicable, to all the municipalities and settlements of the province, and to afford such assistance as may be in its power to the people to enable them to avail themselves of the provisions of the law enacted in their behalf."

EXCERPT FROM THE MINUTES OF THE PHILIPPINE COMMISSION OF DECEMBER 23, 1905.

"*Resolved*, That the provisions of Chapter IV of Act Numbered Nine hundred and twenty-six, known as 'The Public Land Act,' be, and are hereby, immediately extended to the Provinces of Benguet, Nueva Vizcaya, and Lepanto-Bontoc; and

"*Be it further resolved*, That the provincial board of the said provinces are hereby directed to take adequate means to inform the residents of the various municipalities and settlements of their provinces of the adoption of the foregoing resolution, and of the necessity of taking advantage of its provisions before January first, nineteen hundred and seven."

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EXCERPT FROM MINUTES OF THE COMMISSION OF AUGUST 2, 1906.

Commissioner Worcester reminded the Commission that at the time Chapter IV of the Public Land Act was made applicable to the Province of Nueva Vizcaya the provincial board of that province requested that the act in its entirety be put in force in that province; that the Commission, however, deemed it advisable to put it in force only in that portion of the province which was chiefly inhabited by Christian natives.

He further stated that he had communicated at once with the governor of the province in order to obtain the necessary information as to the location and extent of this territory, but his letter was overlooked and a second communication had to be sent before a reply was received; that, in the meantime, the agricultural congress recommended to the Commission that the Public Land Act in its entirety be made applicable to the Christian municipalities of the province of Nueva Vizcaya. The necessary information having now been received: On motion,

"*Resolved*, That the Public Land Act in its entirety be, and is hereby, made applicable to the entire province of Nueva Vizcaya with the exception of the territory formerly included in the Spanish commandancias of Binatangan and Quiangan.

EXCERPT FROM MINUTES OF THE COMMISSION OF DECEMBER 29, 1906.

Resolved, That in accordance with the provisions of section seventy-eight of Act Numbered Nine hundred and twenty-six, known as the "Public Land Act," the provisions of Chapter VI of said Act, save and except subsection six of section fifty-four thereof, are hereby extended over and put in force throughout the whole of the Moro Province.

Leasing of reclaimed land.

[No. 1654.]

AN ACT To provide for the leasing of reclaimed land for commercial purposes, for the leasing of the foreshore and lands under water, and to regulate the construction of bridges over navigable waterways.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The control and disposition of the foreshore as defined in existing law, and the title to all Government or public lands made or reclaimed by the Government by dredging or filling or otherwise throughout the Philippine Islands, shall be retained by the Government without prejudice to vested rights and without prejudice to rights conceded to the city of Manila in the "Luneta Extension."

SEC. 2. (*a*) The Secretary of the Interior shall cause all Government or public lands made or reclaimed by the Government by dredging or filling or otherwise to be divided into lots or blocks, with the necessary streets and alleyways located thereon, and shall cause plats and plans of such survey to be prepared and filed in the Bureau of Lands.

(*b*) Upon the completion of such plats and plans the Governor-General shall give notice to the public that such parts of the lands so made or reclaimed as are not needed for public purposes will be leased for commercial and business purposes, and upon receipt of an application or applications for a lease or leases, the Governor-General shall designate and specify certain portions of the land for such use, and shall give notice by public advertisement that such applications have been made and that the Government will lease lots or blocks, to be specified in said advertisement, for commercial and business purposes, such leases to run for a period of ninety-nine years at a rental of three per centum per annum of the appraised value of the parcel of land leased, the appraisal to be made by the Director of Lands subject to approval by the Secretary of the Interior and conditioned that a new appraisal of said land so leased shall be made in the same manner ten years from the date of the lease and every ten years thereafter, and that the rental after such appraisal shall be based upon the new appraised value at the same rate per centum per annum.

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(*c*) If after any reappraisal a tenant shall consider the new valuation to be excessive, he shall have the right, within three months, to appeal to the Court of First Instance of the district in which the land is situated, and the said court is hereby given jurisdiction to determine the appraisal and fix a just valuation for the land for the period of ten years. Either party shall have the right to appeal from the Court of First Instance to the Supreme Court of the Philippine Islands: *Provided, however*, That the tenant shall pay rent on the basis of the reappraisal pending final determination of the matter by said Court of First Instance. Should the Court of First Instance determine to fix a valuation for the land lower than that fixed in the reappraisal the tenant shall be entitled to a refund of the excess rent paid by him on the basis of such reappraisal.

(*d*) The lease of the said lands shall be executed by the Director of Lands and approved by the Secretary of the Interior, and shall specifically provide, among other things, that improvements thereon of a kind to be approved by the Consulting Architect, as provided in subsection (*f*) of this section, shall be commenced within twelve months of the date of the execution of the lease and shall be completed within a time to be fixed in said lease, and that in case of failure to make such improvements within the time prescribed by the lease or to comply with any or all of the terms and conditions of said lease the same shall thereupon be forfeited, and that all improvements made on the leased property shall vest in and become the property of the Government of the Philippine Islands: *Provided, however*, That the Governor-General may, in his discretion, and upon such terms as he may prescribe, waive the forfeiture herein provided for, or extend the time within which said improvements shall be commenced and completed.

Every such lease shall also contain a provision for the payment of the tax or taxes levied on said land or improvements and providing that upon the failure of the lessee to pay any such tax or taxes or any part thereof the lease shall forthwith cease and determine.

(*e*) The leases above provided for shall be disposed of to the highest and best bidder therefor, subject to such regulations and safeguards as the Governor-General may by executive order prescribe.

(*f*) Plans for buildings or improvements shall be approved by the Consulting Architect, and no buildings or improvements shall be permitted until such approval has been obtained in writing. Such improvements shall also be subject to the ordinances of the proper municipality. In case of difference or dispute between the Consulting Architect and the lessee, final decision shall be made by the Governor-General.

SEC. 3. (*a*) The original cost of the construction of streets, alleyways, and curbing on such reclaimed lands shall be borne by the Insular Government. The cost of putting in sewers and water mains and keeping in repair the streets, alleyways, and curbing constructed at the expense of the Insular Government shall be borne by the municipality in which such lands are situated, and it shall be the duty of such municipality to maintain and keep in repair streets, alleyways, and curbing constructed by the Insular Government as herein provided.

(*b*) Franchises for the use of said streets and alleyways on said lands for private or public purposes may be granted by the Insular Government or, subject to the approval of the Governor-General, by the municipality in which said lands are situated. Franchises granted under this section for the construction and operation of street railways, electric light and power, and telephone lines shall be subject to the provisions of the law then in force governing all such franchises.

SEC. 4. All lands leased under the provisions of the foregoing sections of this Act, and all improvements thereon, shall be subject to local taxation against the lessees, their heirs, executors, administrators, successors, or assigns, to the same extent as if such lessees, their heirs, executors, administrators, successors, or assigns, were the owners of both land and improvements.

SEC. 5. Upon receipt of an application or applications for the lease of any portion of the foreshore or lands under water in the Philippine Islands for the purpose of erecting and maintaining wharves, docks, piers, marine railways, or other appropriate structures, and upon the recommendation of the Secretary of Commerce and Police, the Governor-General may designate and specify such portions of the foreshore or lands under water for such use, and shall give notice by public advertisement that such applications have been made and that the Government will lease such portion of the foreshore, to be specified in said

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advertisement, for wharves, docks, piers, marine railways, or other appropriate structures for a term not to exceed ninety-nine years, with the right on the part of the lessee to erect and maintain such wharves, docks, piers, marine railways, or other appropriate structures, or to make such other beneficial use of such leased foreshore or lands under water as may be specified in the lease, subject, however, to all vested rights or easements of owners of lands adjacent to such foreshore or lands under water.

SEC. 6. The lease mentioned in the section immediately preceeding shall, among other things, contain the following provisions:

(*a*) For the payment by the lessee, his heirs, executors, administrators, successors, or assigns, of an annual rental, which shall be fixed at not less than one per centum of the appraised value of the improvements which the lessee, his heirs, executors, administrators, successors, or assigns, may be authorized to make by the lease. Such appraisal shall be made in the same manner and subject to the same conditions as provided in this Act in the case of a lease by the Government of made or reclaimed lands.

(*b*) That plans and specifications of all wharves or other marine structures authorized by the lease shall be subject to the approval of the Director of Navigation.

(*c*) That on the termination of the lease or any extension thereof, all the improvements made by the lessee, his heirs, executors, administrators, successors, or assigns, shall vest in and become the property of the Government of the Philippine Islands.

(*d*) For the regulation by the Secretary of Commerce and Police of all rates and fees charged to the public, and for the submission to him annually for approval of all tariffs of such rates and fees.

(*e*) For the continuance of the easements of the coast police and other easements reserved in the Law of Waters now in force in the Philippine Islands.

SEC. 7. Upon the recommendation of the Secretary of Commerce and Police and the approval of the Governor-General, every steamship company granted a lease of the foreshore as hereinbefore provided may, by proper condemnation proceedings, acquire, for the purpose of erecting wharves or other structures for the better handling of its steamship business, land not under water adjacent to the foreshore for which such company obtained a lease.

In order to secure the approval of the Governor-General, such steamship company shall file with the Secretary of Commerce and Police an application stating in detail the situation and extent of the land desired, the nature and extent of the wharves or other structures to be erected on the land not under water adjacent to the foreshore, and the character of the business and use to which the applicant desires to put such land.

SEC. 8. In order to encourage municipalities and provinces to construct wharves, piers, docks, and other structures for the convenience of shipping, the Insular Government, through the Bureau of Navigation, shall, without cost, provide such municipalities and provinces with plans and specifications for the construction thereof.

SEC. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 10. This Act shall take effect on its passage.

Enacted, May 18, 1907.

Free Patents.

[No. 1573.]

AN ACT Extending from January first, nineteen hundred and seven, to January first, nineteen hundred and nine, the time within which free patents may be granted to native settlers upon unreserved and unappropriated agricultural public lands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Any native of the Philippine Islands now an occupant and cultivator of unreserved and unappropriated agricultural public lands, as defined by the act of Congress of July first, nineteen hundred and two, who has continuously occupied and cultivated such lands either by himself or through his

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ancestors since August first, eighteen hundred and ninety-eight, or, who, prior to August first, eighteen hundred and ninety-eight, continuously occupied and cultivated such lands for three years immediately prior to said date, and who has been continuously since July fourth, nineteen hundred and two, until the date of the taking effect of this Act an occupier and cultivator of such lands, shall be entitled to have a patent issued to him without compensation for such tract of land, not exceeding sixteen hectares, in the manner provided in Chapter Four of Act Numbered Nine hundred and twenty-six, "The Public Land Act," provided that his application therefor be filed as provided in said chapter prior to January first, nineteen hundred and nine, instead of January first, nineteen hundred and seven, as now provided by section thirty-three of "The Public Land Act," and said section thirty-three is hereby so amended that the words "nineteen hundred and seven" shall be stricken out and in lieu thereof shall be inserted the words "nineteen hundred and nine."

SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, December 13, 1906.

Reservations of Land for Public Use.

[No. 627.]

AN ACT To bring immediately under the operation of "The Land Registration Act" all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes, as amended by Act No. 806.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. (*As amended by Act No. 806.*) All lands, or any interest therein, within the Philippine Islands lying within the boundaries of the areas now or hereafter set apart and declared to be military reservations shall be forthwith brought under the operations of "The Land Registration Act," and such of said lands, and interests therein as shall not be determined to be public lands shall become registered land in accordance with the provisions of said "The Land Registration Act," under the circumstances hereinafter stated.

SEC. 2. (*As amended by Act No. 806.*) Whenever the Commanding General of the United States Army, Division of the Philippines, shall certify to the Civil Governor that all public lands within limits by him described in the Philippine Islands have been reserved by the President of the United States for military purposes, and are lawfully announced and declared military reservations, it is hereby made the duty of the Civil Governor in writing to notify the judge of the Court of Land Registration that such public lands have been reserved for military purposes and announced and declared to be military reservations, and that all private lands, or interests therein, within the limits described, ought forthwith to be brought within the operation of "The Land Registration Act," and to become registered land within the meaning of said "The Land Registration Act."

SEC. 3. (*As amended by Act No. 806.*) Immediately upon receipt of the notice from the Civil Governor in the preceding section mentioned it shall be the duty of the judge of the Court of Land Registration to issue a notice, stating that the lands within the limits aforesaid have been reserved for military purposes, and announced and declared to be military reservations, and that claims for all private lands and interests therein, within the limits aforesaid, must be presented for registration under "The Land Registration Act" within six calendar months from the date of issuing the notice, and that all lands and interests therein within the limits aforesaid not so presented within the time therein limited will be conclusively adjudged to be public lands, and all claims on the part of private individuals for such lands or an interest therein not so presented will

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be forever barred. The clerk of the Court of Land Registration shall immediately upon the issuing of such notice by the judge cause the same to be published once a week for three successive weeks in two newspapers, one of which newspapers shall be in the English language, and one in the Spanish language in the city or province where the land lies, and, if there be no such Spanish or English newspapers having a general circulation in the city or province wherein the land lies, then it shall be a sufficient compliance with this section if the notice be published, as herein provided, in a daily newspaper in the Spanish language and one in the English language, in the city of Manila, having a general circulation. The clerk shall also cause a duly attested copy of the notice in the Spanish language to be posted in a conspicuous place at each angle formed by the lines of the limits of the land so reserved. The clerk shall also issue and cause to be personally served the notice in the Spanish language upon every person living upon or in visible possession of any part of the military reservation. If the person in possession is the head of a family living upon the land, it shall be sufficient to serve the notice upon him, and if he is absent it shall be sufficient to leave a copy at his usual place of residence. The clerk shall certify the manner in which the notices have been published, posted, and served, and his certificate shall be conclusive proof of such publication, posting, and service, but the court shall have power to cause such further notice to be given as in its opinion may be necessary.

SEC. 4. (*As amended by Act No. 806.*) All claims for private lands and interests therein within the limits of such military reservation not presented to the Court of Land Registration within six months from the date of the notice in the previous section provided shall be forever barred, and the lands and interests therein shall be deemed to be public and not private property: *Provided, nevertheless*, That it shall be in the power of the Court of Land Registration, on suitable application, filed within three months after the expiration of the six months first aforesaid, to allow an application and claim to be filed upon proof that the failure to file it within the six months' limitation resulted from fraud, accident, mistake, or excusable negligence.

SEC. 5. Upon the filing of claims and applications for registration in the Court of Land Registration, the same precedure shall be adopted as is by "The Land Registration Act" provided for other claims and applications; but in case of all claims and applications which are finally dismissed, the judgment shall be that the lands embraced therein are public lands, unless the same shall be included within other claims or applications which are favorably acted upon by the court. It shall be the duty of the court to expedite proceedings under this Act, and give to them precdence over other claims for registration under "The Land Registration Act." All rights of appeal secured by "The Land Registration Act" shall be applicable to proceedings under this Act.

SEC. 6. The provisions of sections thirty-eight, thirty-nine, forty, forty-one, and forty-two of Act Numbered One hundred and ninety, entitled "An Act providing a code of procedure in civil actions and special proceedings in the Philippine Islands," are hereby made applicable to all lands, not more than sixteen hectares in extent, within the limits of any military reservation, notwithstanding such lands would be public lands were it not for titles acquired in the manner stated in said sections thirty-eight, thirty-nine, forty, forty-one, and forty-two.

SEC. 7. (*As amended by Act No. 806.*) When the Commanding General of the United States Army, Division of the Philippines, shall certify to the Civil Governor that the military authorities of the United Staes wish to acquire by purchase for military purposes property owned by private individuals in the Philippine Islands, and not within the boundaries set apart for military reservations, and shall describe specifically the lands so desired to be purchased, and shall certify that the titles to the same are so uncertain that it is impracticable to determine who the true individual owners thereof are, and ask relief in accordance with the provisions of this section, it is hereby made the duty of the Civil Governor in writing to notify the judge of the Court of Land Registration of such certification, and request that the lands mentioned forthwith be brought under the operation of "The Land Registration Act," and to become registered land within the meaning thereof. Immediately upon the receipt of such notice from the Civil Governor, it shall be the duty of the judge of the Court of Land Registration to issue a notice stating the contents of the notice received by him from the Civil Governor, and that claims for all private lands, and interests therein, within the limits described in such notice, must be presented for regis-

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tration under "The Land Registration Act" within six calendar months from the date of issuing notice, and that all lands and interests therein, within the limits aforesaid, not so presented within the time therein limited, will be conclusively adjudged to be public lands, and all claims on the part of private individuals for such lands or an interest therein not so presented will be forever barred. And thereupon such proceedings shall be had by the Court of Land Registration for the determination of the true ownership of the lands included in such limits as are provided in cases of land lying within the boundaries of military reservations, as set forth in sections three, four, and five of this Act; and the provisions of section six are likewise made applicable to all lands in this section mentioned.

SEC. 8. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 9. This Act shall take effect on its passage.

Enacted, February 9, 1903.

[No. 1138.]

AN ACT To bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for naval reservations, and all lands desired to be purchased by the Government of the United States for naval purposes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The provisions of Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of the Land Registration Act all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes," are hereby made applicable to all lands or buildings or any interest therein within the Philippine Islands lying within the boundaries of the areas now or hereafter set apart and declared to be naval reservations: *Provided, however,* That wherever the word "military" appears in said Act Numbered Six hundred and twenty-seven there shall be substituted the word "naval" for the purposes of this Act: *And provided further,* That wherever the words "commanding general of the United States Army, Division of the Philippines," appear in said Act Numbered Six hundred and twenty-seven there shall be substituted the words "commander in chief of the United States Asiatic Fleet," for the purposes of this Act.

SEC. 2. The method of procedure provided in Act Numbered Six hundred and twenty-seven for settling the titles to lands within military reservations, or which are sought to be purchased for military purposes, is hereby made applicable to naval reservations and to lands which the naval authorities of the United States wish to acquire by purchase for naval purposes, owned by private individuals and not within the boundaries set apart for naval reservations, and in case of proceedings in accordance with the provisions of this Act, claims for private lands, buildings, and interests within the limits of naval reservations not presented to the Court of Land Registration, as provided in said Act Numbered Six hundred and twenty-seven, shall be forever barred, and the lands, buildings, and interests therein shall be deemed to be public and not private property, in accordance with the provisions of said Act Numbered Six hundred and twenty-seven.

SEC. 3. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 4. This Act shall take effect on its passage.

Enacted, April 30, 1904.

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[No. 648.]

AN ACT Authorizing the Civil Governor to reserve for civil public purposes, and from sale or settlement, any part of the public domain not appropriated by law for special public purposes, until otherwise directed by law, and extending the provisions of Act Numbered Six hundred and twenty-seven so that public lands desired to be reserved by the Insular Government for public uses, or private lands desired to be purchased by the Insular Government for such uses may be brought under the operation of the Land Registration Act.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The Civil Governor is hereby authorized and empowered by executive order to reserve from settlement or public sale and for specific public uses any of the public domain of the Philippine Islands the use of which is not otherwise directed by law; and thereafter such land shall not be subject to settlement or sale and shall be used for the specific purposes directed by such executive order until otherwise provided by law.

SEC. 2. Whenever the Civil Governor, in writing, shall certify that all public lands within limits by him described in the Philippine Islands are reserved for civil public uses, either of the Insular Government or of any provincial or municipal government, and shall give notice thereof to the judge of the Court of Land Registration, it shall be the duty of the judge of said court to proceed to issue notice thereof and that claims for all private lands, buildings and interests therein, within said limits must be presented for registration under "The Land Registration Act" in the manner provided in Act Numbered Six hundred and twenty-seven, entitled "An Act to bring immediately under the operation of 'The Land Registration Act' all lands lying within the boundaries lawfully set apart for military reservations, and all lands desired to be purchased by the Government of the United States for military purposes." The procedure for the purpose of this Act and the legal effects thereof, shall thereupon be in all respects as provided in sections three, four, five, and six of said Act Numbered Six hundred and twenty-seven.

SEC. 3. Whenever the Civil Governor shall certify that the civil authorities, either insular, provincial, or municipal, wish to acquire by purchase for public use property owned by private individuals in the Philippine Islands, and not within the boundaries of public lands set apart for such use in accordance with the preceding section, and shall describe specifically the land so desired to be purchased, and further certify that the titles to the same are so uncertain that it is impracticable to determine who are the true individual owners thereof, it shall be the duty of the judge of the Court of Land Registration upon receipt of such certification to proceed to bring the lands mentioned forthwith under the operation of "The Land Registration Act" in the manner and with the legal effect provided in section seven of said Act Numbered Six hundred and twenty-seven.

SEC. 4. The public good requiring the speedy enactment of this bill the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 5. This Act shall take effect on its passage.

Enacted, March 3, 1903.

Land Grants from Moro Sultans or Dattos.

[No. 718.]

AN ACT Making void land grants from Moro sultans or dattos or from chiefs of non-Christian tribes when made without governmental authority or consent.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. All grants, deeds, patents, leases, or other instruments of conveyance purporting to convey from Moro sultans or dattos, or from chiefs of non-Christian tribes, lands situate in the Philippine Archipelago or rights of property, privileges, or easements appertaining to, or growing out of, land therein, made without the authority of the Spanish Government while the

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Philippine Archipelago was under the sovereignty of Spain, or without the consent of the United States Government or of the Insular Government since the sovereignty of the Archipelago of the Philippines was transferred by the Treaty of Paris from Spain to the United States, and not based on any lawful patent or grant of the Government of Spain or the United States, or of the Insular Government, whether such grants, deeds, patents, leases, or other instruments of conveyance were made before the passage of this Act or shall be made after its passage, being made without any lawful authority or ownership, are hereby declared to be illegal, void, and of no effect.

SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, April 4, 1903.

Internal revenue law.

[No. 1189.]

AN ACT To provide revenue for the support of the insular, provincial, and municipal governments by internal taxation.

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ARTICLE XI.

STAMP TAXES ON SPECIFIED OBJECTS.

* * * * * * *

SEC. 116. There shall be levied, collected, and paid for and in respect to the several bonds, debentures, or certificates of stock and of indebtedness, and other documents, instruments, matters, and things mentioned and described in this section, or for or in respect to the vellum, parchment, or paper upon which such instruments, matters, or things or any of them shall be written or printed by any person or persons who shall make, sign, or issue the same, on and after January first, nineteen hundred and five, the several taxes following:

* * * * * * *

Eleventh. (*a*) On each power of attorney or proxy for voting at any election for officers of any incorporated company or association, except railroad companies or associations organized for charitable or literary purposes or to manage public cemeteries, twenty centavos; (*b*) on each power of attorney to sell and convey real estate, or to rent and lease the same, to receive or to collect the rent therefrom, to sell or transfer any stocks, bonds, or securities, or to collect any dividends or interests therein, or to perform any and all other acts not hereinbefore specified, twenty centavos: *Provided*, That no stamps shall be required upon any papers necessary for use in the collection of claims from, or by, the Insular Government, or from, or by, any provincial or municipal government.

Twelfth. On each lease, agreement, memorandum, or contract for the hire, use, or rent of any land or tenements, or portions thereof, (*a*) if executed for a period of time not more than one year, twenty centavos; (*b*) if executed for a period of time more than one year and not more than three years, fifty centavos; (*c*) if executed for a period of time more than three years, one peso.

Thirteenth. On every mortgage or pledge of lands, estate, or property, real or personal, heritable or movable, whatsoever, where the same shall be made as a security for the repayment of any definite and certain sum of money lent at the time or previously due and owing or forborne to be paid being payable, and on any conveyance of land, estate, or property whatsoever in trust, or to be sold or otherwise converted into money, which shall be and intended only as security, either by express stipulation or otherwise, when the amount for which the mortgage or deed of trust is given is not less than one thousand pesos nor more than three thousand pesos, fifty centavos, and on each three thousand pesos or fractional part thereof, in excess of nine thousand pesos, fifty centavos additional: *Provided*, That upon each and every assignment or transfer of any mortgage, lease, or policy of insurance, or the renewal or

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continuance of any agreement, contract, or charter by altering or otherwise, a stamp tax shall be levied, collected, and paid at the same rate as that imposed on the original instrument: *And provided further*, That whenever any bond or note shall be secured by a mortgage or deed of trust but one tax shall be collected upon such papers and such tax shall be at the highest rate imposed in this section on such mortgage or bond or note as the case may be.

Fourteenth. On all conveyances, deeds, instruments, or writings whereby any lands, tenements, or other realty sold shall be granted, assigned, transferred, or otherwise conveyed to the purchaser or purchasers, or to any other person or persons designated by such purchaser or purchasers, when the true consideration or value received for such realty is more than two hundred pesos, but not more than one thousand pesos, fifty centavos; and for each additional one thousand pesos or fractional part thereof, of such consideration, fifty centavos: *Provided*, That in sales of encumbered property the tax shall be collected on the net amount of the consideration after deducting the amount of the encumbrance: *And provided further*, That original certificates under the Land Registration Act and patents to lands granted under the Public Land Act shall be exempted from the payment of this tax.

The tax imposed in this paragraph shall be paid and assessed on the complete and full amount of money or other valuable consideration actually paid or delivered in exchange for such lands, tenements, or other realty; and the Collector of Internal Revenue, provincial treasurers, and other revenue officers, when there is good reason to believe that a fraud has been perpetrated on the revenues through the declaration of a fictitious consideration in any such conveyance, deed, instrument, or writing, shall from the real-estate assessment rolls, or from any other reliable source, assess the lands, tenements, or other realty at their true market value and the tax on such conveyance, deed, or instrument shall be assessed and collected on such true market value of the realty conveyed; and any person who, with the intent to defraud the revenues, places a fictitious valuation on any realty conveyed and subject to the tax imposed in this paragraph, or any valuation which shall be less than the actual amount of money or other valuable thing received or delivered in payment for such realty, shall, in addition to the payment of the tax assessed on the actual consideration received or true market value of the realty conveyed, forfeit and pay a sum equal to twice the amount of such tax.

Fifteenth. The fees prescribed in section one hundred and fourteen of the Land Registration Act, and the amendments thereto, shall be paid in the amounts and to the officials provided by said Act and its amendments, and shall be accounted for as provided in said Act.

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SEC. 153. This Act shall take effect on the first day of August, nineteen hundred and four.

Enacted, July 2, 1904.

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FRIAR LANDS.

ADMINISTRATION, LEASING AND SALE.

The Friar Lands Act—No. 1120.

AN ACT Providing for the administration and temporary leasing and sale of certain haciendas and parcels of land, commonly known as friar lands, for the purchase of which the government of the Philippine Islands has recently contracted, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of an Act of the Congress of the United States entitled "An Act temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes," approved on the first day of July, nineteen hundred and two, as amended by Act No. 1287.

Whereas, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of an Act of the Congress of the United States, entitled "An Act temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes," approved July first, nineteen hundred and two, the Government of the Philippine Islands, on the twenty-second day of December, nineteen hundred and three, entered into contracts with the Philippine Sugar Estates Development Company, Limited, La Sociedad Agrícola de Ultramar, the British-Manila Estates Company, Limited, and the Recoleto Order of the Philippine Islands, for the purchase of about one hundred and sixty-four thousand one hundred and twenty-seven hectares of land, situated in the Provinces of La Laguna, Bulacan, Cavite, Bataan, Cebu, Rizal, Isabela, and Mindoro, for the aggregate sum of seven million two hundred and thirty-nine thousand seven hundred and eighty-four dollars and sixty-six cents, money of the United States; and

Whereas in said contracts of purchase it was provided, among other things, that the Government of the Philippine Islands should have a period of six months from the date of said contracts within which to examine the titles to said lands and also within which to survey the same in order to ascertain whether there is the quantity of land specified in said contracts, and, in the event there is not, that a proportionate reduction shall be made in the amounts agreed to be paid therefor; and it was further provided in said contracts that the said parties, so agreeing to sell, obligated themselves to convey good and indefeasible titles to said lands by proper conveyances; and

Whereas by said section sixty-five of said Act of Congress the Government of the Philippine Islands is empowered to lease the said lands after their acquisition for a period not exceeding three years, and to sell the same on such terms and conditions as it may prescribe, subject to the limitations and conditions contained in said Act of Congress: *Provided*, That all deferred payments and the interest thereon shall be payable in the money prescribed for the payment of principal and interest of the bonds authorized to be issued and sold for the purpose of realizing the money necessary to pay for said lands by section sixty-four of said Act of Congress, and that said deferred payments shall bear interest at the rate borne by said bonds: *And provided further*, That all moneys realized or received from the sales or other disposition of said lands, or by reason thereof, shall constitute a trust fund for the payment of principal and interest of said bonds, and also constitute a sinking fund for the payment of said bonds at their maturity: *And provided further*, That actual settlers and occupants at the time said lands are acquired by the Government shall have the preference over all others to lease, purchase, or acquire their holdings within such reasonable time as may be determined by said Government; and

Whereas the said lands are not "public lands" in the sense in which those words are used in the Public Land Act, Numbered Nine hundred and twenty-

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six, and can not be acquired or leased under the provisions thereof, and it is necessary to provide proper agencies for carrying out the terms of said contracts of purchase and the requirements of said Act of Congress with reference to the leasing and selling of said lands and the creation of a sinking fund to secure the payment of the bonds so issued: Now, therefore,

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The Civil Governor is authorized and directed to have careful examination made to ascertain the sufficiency and soundness of the titles to said land so contracted to be purchased by the Government of the Philippine Islands from the said corporations as set forth in the preamble hereof.

His action in employing the firm of Del Pan, Ortigas and Fisher, attorneys at law in the city of Manila, to make such examination and also to perform all legal services required of them in completing such purchases and thereafter in the leasing and selling of said lands as hereinafter provided, they to be compensated for their services at the rate of five thousand five hundred dollars per annum, payable monthly, for such time as in the opinion of the Civil Governor their services may be needed, is hereby approved and confirmed.

SEC. 2. The Consulting Engineer to the Commission is hereby directed to have careful surveys made of the said haciendas and tracts of land in order to ascertain with accuracy and certainty whether there is the amount of land in each of said haciendas and tracts specified in said contracts, and for that purpose he is empowered to put in the field and maintain the necessary surveying parties, and any funds in his hands at the present time not in terms devoted to defraying the cost of specific public works are hereby declared available for that purpose. As soon as these surveys shall have been completed he shall make report of the results thereof to the Civil Governor. Such steps as have already been taken by the Consulting Engineer by direction of the Civil Governor looking to the survey of said haciendas and lands are approved and confirmed.

SEC. 3. The firm of Del Pan, Ortigas and Fisher is also directed, as soon as the examination of the title deeds to said property shall have been completed, to make report of the result of their investigations in that behalf to the Civil Governor, and under his direction to supervise the final deeds of conveyance of said lands by said corporations to the Government of the Philippine Islands. The Civil Governor is also directed to submit their report together with the said deeds to the Attorney-General for his opinion.

SEC. 4. The Civil Governor is hereby empowered, when it shall have been ascertained that the titles to said lands are perfect and indefeasible and proper instruments of conveyance are tendered by said corporations, to direct the payment to the corporations named in the preamble of the several sums agreed to be paid for said lands, and to that end to draw the warrants of the Government of the Philippine Islands upon the sum realized from the sale of the bonds issued and sold as provided in Act Numbered Ten hundred and thirty-four.

SEC. 5. When the titles to said lands are finally vested in the Government of the Philippine Islands, they shall be under the immediate control and direction of the Bureau of Public Lands. The Chief of the Bureau of Public Lands is empowered and directed, pending the completion of the purchase of said lands, to receive, take charge of, and carefully preserve the said contracts of sale and purchase and all muniments, documents, title deeds, or other papers pertaining to said lands, and all field notes, surveys, and other data relating thereto, and also the deeds of conveyance hereafter made pursuant to the terms of said contracts of sale and purchase, and thereafter to keep and preserve the same, except as required for registration of said lands.

SEC. 6. (*As amended by Act No. 1287.*) The title deeds and instruments of conveyance pertaining to the lands in each province, when executed and delivered by said grantors to the Government and placed in the keeping of the Chief of the Bureau of Public Lands, as above provided, shall be by him transmitted to the register of deeds of each province in which any part of said land lies, for registration in accordance with law. "But before transmitting the title deeds and instruments of conveyance in this section mentioned to the register of deeds of each province for registration, the Chief of the Bureau of Public Lands shall record all such deeds and instruments at length in one or more books to be provided by him for that purpose and retained in the Bureau of Public Lands. He shall certify on each record the date on which the same was made. Copies

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of said records made by the Chief of the Bureau of Public Lands, when duly certified by him, shall be received in all courts of the Philippine Islands as sufficient evidence of the contents of the instruments so recorded whenever it is not practicable to produce the originals in court."

SEC. 7. Upon the vesting of the titles to said lands in the Government of the Philippine Islands by proper deeds of conveyance, or sooner if so directed by the Civil Governor, the Chief of the Bureau of Public Lands shall ascertain the names and residences of the actual, bona fide settlers and occupants then in possession of said lands or of any portion of them, together with the extent of their several holdings and the character and value thereof. He is also directed to ascertain from said occupants whether they desire to purchase their holdings upon the terms prescribed in the succeeding sections.

SEC. 8. In case any occupant in possession does not desire to purchase his holding, but does desire to lease the same, then it shall be the duty of the Chief of the Bureau of Public Lands, after vesting of title, to see that such occupant attorns in due form to the Government and enters into a lease with the usual covenants and agrees to pay a reasonable rental for the use and occupation of his holding. Such rental shall be fixed by the Chief of the Bureau of Public Lands, but in no instance shall any lease be made for a longer term than three years.

SEC. 9. In the event the Chief of the Bureau of Public Lands should find any of the said lands vacant, he is directed to take possession and charge thereof, and he may either lease such unoccupied lands for a term not exceding three years or offer the same for sale, as in his judgment may seem for the best interests of the Government, and in making such sales he shall proceed as provided in chapter two of the Public Land Act.

SEC. 10. Should he find any of the said lands in possession of a person or persons declining either to buy or to rent, as above set forth, he shall take possession thereof if he can do so peaceably, and if not he shall begin proper legal proceedings in the Court of Land Registration to settle title and to oust him or them from his or their holdings and, upon adjudication in favor of the Government, shall likewise take possession of the same with the same power and authority as though originally vacant. He shall not, however, sell any of the main hacienda houses or other large and substantial buildings save upon a resolution of the Commission authorizing him so to do.

SEC. 11. Should any person who is the actual and bona fide settler upon and occupant of any portion of said lands at the time the same is conveyed to the Government of the Philippine Islands desire to purchase the land so occupied by him, he shall be entitled to do so at the actual cost thereof to the Government, and shall be allowed ten years from the date of purchase within which to pay for the same in equal annual installments, if he so desires, all deferred payments to bear interest at the rate of four per centum per annum.

SEC. 12. It shall be the duty of the Chief of the Bureau of Public Lands by proper investigation to ascertain what is the actual value of the parcel of land held by each settler and occupant, taking into consideration the location and quality of each holding of land and any other circumstances giving it value. The basis of valuation shall likewise be, so far as practicable, such that the aggregate of the values of all the holdings included in each particular tract shall be equal to the cost to the Government of the entire tract, including the cost of surveys, administration, and interest upon the purchase money to the time of sale. When the cost thereof shall have been thus ascertained, the Chief of the Bureau of Public Lands shall give the said settler and occupant a certificate which shall set forth in detail that the Government has agreed to sell to such settler and occupant the amount of land so held by him, at the price so fixed, payable as provided in this Act at the office of the Chief of the Bureau of Public Lands, in gold coin of the United States or its equivalent in Philippine currency, and that upon the payment of the final installment together with all accrued interest the Government will convey to such settler and occupant the said land so held by him by proper instrument of conveyance, which shall be issued and become effective in the manner provided in section one hundred and twenty-two of the Land Registration Act. The Chief of the Bureau of Public Lands shall, in each instance where a cerificate is given to the settler and occupant of any holding, take his formal receipt showing the delivery of such certificate, signed by said settler and occupant.

SEC. 13. The acceptance by the settler and occupant of such certificate shall be considered as an agreement by him to pay the purchase price so fixed and in the installments and at the interest specified in the certificate, and he shall by

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such acceptance become a debtor to the Government in that amount together with all accrued interest. In the event that any such settler and occupant may desire to pay for his holding of said lands in cash, or within a shorter period of time than that above specified, he shall be allowed to do so, and if payment be made in cash the lands shall at once be conveyed to him as above provided. But if purchase is made by installments, the certificate shall so state in accordance with the facts of the transaction: *Provided, however*, That every settler and occupant who desires to purchase his holding must enter into the agreement to purchase such holding by accepting the said certificate and executing the said receipt whenever called on so to do by the Chief of the Bureau of Public Lands, and a failure on the part of the settler and occupant to comply with this requirement shall be considered as a refusal to purchase, and he shall be ousted as above provided and thereafter his holding may be leased or sold as in case of unoccupied lands: *And provided further*, That the Chief of the Bureau of Public Lands in his discretion may require of any settler and occupant so desiring to purchase that, pending the investigation requisite to fix the precise extent of his holding and its cost, he shall attorn to the Government as its tenant and pay a reasonable rent for the use of his holding; but no such lease shall be for a longer term than three years, and refusal on the part of any settler and occupant so desiring to purchase to execute a lease pending such investigation shall be treated as a refusal either to lease or to purchase, and the Chief of the Bureau of Public Lands shall proceed to oust him as in this Act provided.

SEC. 14. It shall be the duty of the Chief of the Bureau of Public Lands to collect and receive all rent and installments of purchase money and interest thereon due and payable under the provisions of this Act, and to give proper receipts and acquittances therefor and make proper record thereof in the books of his office.

SEC. 15. The Government hereby reserves the title to each and every parcel of land sold under the provisions of this Act until the full payment of all installments of purchase money and interest by the purchaser has been made, and any sale or incumbrance made by him shall be invalid as against the Government of the Philippine Islands and shall be in all respects subordinate to its prior claim.

SEC. 16. In the event of the death of a holder of a certificate the issuance of which is provided for in section twelve hereof, prior to the execution of a deed by the Government to any purchaser, his widow shall be entitled to receive a deed of the land stated in the certificate upon showing that she has complied with the requirements of law for the purchase of the same. In case a holder of a certificate dies before the giving of the deed and does not leave a widow, then the interest of the holder of the certificate shall descend and deed shall issue to the persons who under the laws of the Philippine Islands would have taken had the title been perfected before the death of the holder of the certificate, upon proof of the holders thus entitled of compliance with all the requirements of the certificate. In case the holder of the certificate shall have sold his interest in the land before having complied with all the conditions thereof, the purchaser from the holder of the certificate shall be entitled to all the rights of the holder of the certificate upon presenting his assignment to the Chief of the Bureau of Public Lands for registration.

SEC. 17. In the event that any lessee or purchaser of land under the provisions of this Act should fail to pay his rent or any installment of purchase money and interest thereon, or accrued interest on any installment not due, when and as the same matures, it shall be the duty of the Chief of the Bureau of Public Lands at once to protect the Government from loss. In the case of a lease, when the lessee is delinquent in payment of rent, the Chief of the Bureau of Public Lands is empowered to declare the lease forfeited, making proper entry to that effect in the books of his office and giving notice thereof to the tenant, and to enter upon and take possession of the land held by the lessee and bring suit against the lessee for all rent due; in the case of a delinquent purchaser, the Chief of the Bureau of Public Lands may enforce payment of any past-due installment and interest by bringing suit to recover the same with interest thereon, and also to enforce the lien of the Government against the land by selling the same in the manner provided by Act Numbered One hundred and ninety for the foreclosure of mortgages. In the event of such sale the purchaser at such sale shall acquire a good and indefeasible title. The proceeds of sale shall be applied to the payment of the costs of court and of all installments due or to become due on such land. If the proceeds of the sale are sufficient to pay all delinquent installments as well as all future installments

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and all costs of the litigation, there shall be no further claim or liability against the original purchaser. If the proceeds of the sale of said lands should amount to more than sufficient to pay all purchase money and interest due the Government and costs of suit, the surplus thereof shall be returned to the original purchaser, or to the person entitled thereto.

SEC. 18. No lease or sale made by the Chief of the Bureau of Public Lands under the provisions of this Act shall be valid until approved by the Secretary of the Interior.

SEC. 19. No purchaser or lessee under this Act shall acquire any exclusive rights to any canal, ditch, reservoir, or other irrigation works, or to any water supply upon which such irrigation works are or may be dependent, but all of such irrigation works and water supplies shall remain under the exclusive control of the Government of the Philippine Islands and be administered under the direction of the Chief of the Bureau of Public Lands for the common benefit of those interests dependent upon them. And the Government reserves as a part of the contract of sale in each instance the right to levy an equitable contribution or tax for the maintenance of such irrigation works, the assessment of which shall be based upon the amount of benefits received, and each purchaser under this Act, by accepting the certificate of sale or deed herein provided to be given, shall be held to assent thereto. And it is further provided that all lands leased or conveyed under this Act shall remain subject to the right of way of such irrigation canals, ditches, and reservoirs as now exist or as the Government may hereafter see fit to construct.

SEC. 20. All persons receiving title to lands under the provisions of this Act shall hold such lands subject to the same public servitudes as existed upon lands owned by private persons under the sovereignty of Spain, including those with reference to the littoral of the sea and the banks of navigable rivers and rivers upon which rafting may be done.

SEC. 21. The Civil Governor, when authorized by resolution of the Commission, may, by proclamation, designate any tract or tracts of said lands as nonalienable, and reserve the same for public use, and thereafter such tracts shall not be subject to sale, lease, or other disposition under this Act.

SEC. 22. It shall be the duty of the Chief of the Bureau of Public Lands to make quarterly reports, through the Secretary of the Interior, to the Commission showing the lands leased or sold by him in accordance with the provisions of this Act, the amounts of money derived from such rentals and sales, and such other information as in his opinion may be of value to the Commission in connection with the said lands and their administration and disposition as provided by this Act. Both the Secretary of the Interior and the Chief of the Bureau of Public Lands shall have the right to require of the special counsel named in the first section hereof, or of their successors, such advice and assistance as from time to time may be required by them in the performance of their duties under this Act, and it shall be the duty of said counselors to give such legal advice and assistance.

SEC. 23. All moneys derived by the Chief of the Bureau of Public Lands from the leasing or sale of said lands, or from interest on deferred payments thereon, shall by him be promptly deposited in the Insular Treasury. Such moneys shall be by the Treasurer held separate and apart from general insular funds and shall constitute a trust fund for the payment of the principal and interest of the seven million two hundred and thirty-seven thousand dollars of bonds, issued and sold by the Secretary of War in the name and on behalf of the Government of the Philippine Islands for the purpose of raising money to pay the purchase price of said lands as provided in Act Numbered Ten hundred and thirty-four, entitled "An Act providing for the issue of bonds of the Government of the Philippine Islands to the amount of seven million two hundred and thirty-seven thousand dollars, gold coin of the United States of the present standard value, for the purpose of acquiring funds for the payment of the purchase price of certain large tracts of land in the Philippine Islands, commonly known as the friar lands, pursuant to the provisions of sections sixty-three, sixty-four, and sixty-five of the Act of Congress entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,' approved July first, nineteen hundred and two." Said money shall also constitute a sinking fund for the payment of said bonds at maturity and may be invested and reinvested in safe interest-bearing bonds or other securities, which shall likewise be held by the Treasurer as a part of such sinking fund, and all interest, dividends, or profits derived from said bonds or other securities thus purchased shall likewise be a part of such sinking fund and

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may in turn be invested and reinvested in bonds or other securities. All purchases of bonds or other securities by the Treasurer shall be subject to the approval of the Secretary of Finance and Justice.

SEC. 24. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions, consistent with this Act, as may be necessary and proper to carry into effect all the provisions hereof that are to be administered by or under the direction of the Bureau of Public Lands, and for the conduct of all proceedings arising under such provisions.

SEC. 25. The sum of ten thousand pesos, Philippine currency, is hereby appropriated, out of any funds in the Insular Treasury not otherwise appropriated, for the purpose of paying the salary of the special counsel referred to in the first section hereof and for making the investigations and surveys required hereby and for the general carrying out of the provisions of this Act.

SEC. 26. The short title of this Act shall be "The Friar Lands Act."

SEC. 27. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 28. This Act shall take effect on its passage.

Enacted, April 26, 1904.

Friar Lands Loan Fund.

[No. 1736.]

AN ACT Appropriating the sum of one hundred thousand pesos, for the purpose of establishing a reimbursable fund for the promotion of agricultural pursuits upon certain haciendas and parcels of land, commonly known as "Friar lands," and for the extension of the cultivated area thereof.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. There is hereby appropriated out of any funds in the Insular Treasury not otherwise appropriated, the sum of one hundred thousand pesos, for the purpose of establishing a reimbursable fund, under the direction and control of the Director of Lands except as hereinafter provided, which shall be known as the Friar Lands Loan Fund, and which shall be made available in accordance with the provisions hereinafter specified, for the making of mortgage loans upon growing crops and salable commodities manufactured therefrom, work animals, warehouses, mill houses and machinery, and other property both real and personal belonging to actual and bona fide cultivators of the so-called Friar Estates, for the encouragement of agricultural pursuits and the extension of the cultivated areas of the said estates.

SEC. 2. The Secretary of the Interior shall designate to the Director of Lands the maximum amount of the Friar Lands Loan Fund which may be loaned in accordance with the provisions of this Act within any given period of time, the rate of interest which such loans shall bear, the term within which the mortgages shall be redeemed, the estate or estates to which the provisions of this Act shall be extended, the kind or kinds of crops or salable commodities manufactured therefrom and the class or classes of buildings, animals or other property, both real and personal, which may become subject to mortgage as herein provided, the manner in which advances of loans shall be made and the maximum amount which shall be advanced for each hectare under cultivation: *Provided, however*, That in no case shall the maximum amount so advanced exceed one hundred pesos for each hectare cultivated by the mortgagor.

SEC. 3. The Director of Lands shall, under the direction and approval of the Secretary of the Interior, promulgate such regulations and issue such forms and instructions as may become necessary to secure the Government against loss and to carry out the purposes of this Act. He shall likewise cause to be kept a full and complete record of all transactions regarding loans and payments thereof, and shall keep such books and render such accounts approved by the Insular Auditor as may be necessary for the proper accounting for said fund, and loans made therefrom, together with interest on such loans.

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SEC. 4. By and with the approval of the Secretary of the Interior the Director of Lands is hereby empowered, for and on behalf of the Government of the Philippine Islands, to make such loans as are authorized by this Act, and to execute as mortgagee, acting for and on behalf of the Government of the Philippine Islands, the necessary mortgages to carry out the purposes of this Act, and all mortgages executed under this Act shall be executed to the Director of Lands, mortgagee, acting for and on behalf of the Government of the Philippine Islands.

SEC. 5. For the purposes of this Act the Director of Lands shall be the trustee for all mortgagors for the purpose of disbursing amounts advanced in consideration of the mortgages, and shall have custody of all mortgages and other securities for the mortgage debts pending their final satisfaction and release. He shall approve or disapprove all applications for loans, either wholly or in part, and such approval or disapproval shall be final and conclusive: *Provided, however*, That the Secretary of the Interior shall endorse upon each mortgage his approval thereof, before said mortgage shall be considered as valid and effective.

SEC. 6. In case the mortgagors have failed or neglected to discharge the mortgages in accordance with the agreement therein specified, the Director of Lands shall, upon the maturity of the mortgage notes, proceed to the foreclosure of the mortgages in the manner provided by law. Whenever, in his opinion, the interests of the Insular Government are in jeopardy through the failure or neglect of the mortgagors properly to observe the conditions of the mortgage agreements, the Director of Lands shall likewise proceed to the foreclosure of all mortgages, or shall take such other action as may to him seem necessary in the premises.

SEC. 7. The actual and necessary expenses arising from the administration of the Friar Lands Loan Fund shall be advanced from the general appropriations made for the Bureau of Lands, and shall be reimbursed thereto from the interest and profits realized from the mortgage loans which may be made in accordance with the provisions of this Act.

SEC. 8. Upon the repayment and satisfaction of all mortgage debts the principal of the loans shall be reimbursed to the Friar Lands Loan Fund as established by section one of this Act, and all net profits from said loans shall likewise accrue to and become a part of said fund, and may be available for any or all of the purposes for which said fund may be used.

SEC. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 10. This Act shall take effect on its passage.

Enacted, October 2, 1907.

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BUREAU OF LANDS.

(Pamphlet containing)

MINING LAWS OF THE PHILIPPINE ISLANDS.

Being the provisions of the Act of Congress approved July 1, 1902, as amended by Section 9 of the Act of Congress approved February 6, 1905; also Act No. 624 of the Philippine Commission, as amended by Acts Nos. 777, 859, 1134, and 1399 of the Philippine Commission; and Act No. 1128 of the Philippine Commission, issued February 1, 1906.

Provisions contained in Act of Congress approved July 1, 1902, as amended by Section 9 of the Act of Congress approved February 6, 1905.

MINERAL LANDS.

Sections 20 to 62 inclusive (see pages 452–460).

Acts of Philippine Commission.

[No. 624.]

An Act Prescribing regulations governing the location and manner of recording mining claims, and the amount of work necessary to hold possession of a mining claim, under the provisions of the Act of Congress Approved July first, Nineteen hundred and two, entitled "An Act Temporarily to provide for the administration of the affairs of Civil Government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The term *mineral claim* as used in these regulations shall be understood to mean *lode claim*, and the term *mining claim* shall be understood to include both *lode* and *placer* claims. A placer claim shall be understood to mean a claim of land more valuable for placer mining, stone quarrying, or for the securing of earth for use in tile, brick, pottery, paint, or other manufacture, or of petroleum, guano, or other mineral product, than for other purposes. The rules and regulations for the securing of claims so defined as placer claims shall be as for placer claims as mentioned in this Act.

SEC. 2. Until other officers may be designated by the Government of the Philippine Islands as mining recorders, the provincial secretaries shall act as such in their respective provinces. In provinces or districts where civil government has not been established such military officers as may be designated for that purpose by the commanding general, Division of the Philippines, shall act as mining recorders.

SEC. 3. (*As amended by Acts Nos. 777 and 1134.*) All declarations and affidavits regarding mining claims, and all other documents and instruments in writing, of whatever character or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein, shall be recorded in the order in which they are filed for record, and from and after such filing for record all declarations and affidavits regarding mining claims, and all documents and instruments in writing, of whatever kind or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein shall constitute notice to all persons and to the whole world of the contents of said declarations, affidavits, documents, and written instruments and of the legal effect thereof, and under no circumstances shall any departure be made from that course.

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The form of declaration of location of a mineral claim shall be as follows:

DECLARATION OF LOCATION.

The undersigned hereby declares and gives notice that, having complied with the provisions of the act of Congress approved July 1, 1902, relative to the location of mining claims, he has located _____ linear feet on a lode of mineral-bearing rock, situate in the barrio of _____ _____, within the jurisdictional limits of the municipality of _____ _____, Province of _____, district of _____, island of _____, P. I.

That the name of the above location is the _____ mineral claim, and that the same was located by him on the _____ day of _____, A. D. 190 .

That there is written on post No. 1 (here insert an exact copy of what is inscribed on post No. 1); and upon post No. 2 (here insert an exact copy of what is inscribed on post No. 2).

That the said claim is situate (here state as accurately as possible, preferably by course and distance, the position of the claim with reference to some natural object or permanent monument).

_____,
Locator.

Witness:

_____

Witness:

_____

SEC. 4. The mining recorder shall note on each instrument filed for record the year, month, and day, and the hour and minute of the day on which the same was so filed, and after it has been recorded he shall endorse on the back thereof a certificate in the following form:

OFFICE OF THE MINING RECORDER.

_____{DISTRICT OF / PROVINCE OF}_____

_____, _____, *190*__

The within instrument was filed for record in this office at _____ o'clock and _____ minutes _____ m., on the _____ day of _____, A. D. 190__, and has been recorded in book _____ of Records of Mining Claims, at page _____.

_____,
Mining Recorder.

SEC. 5. (*As amended by Acts Nos. 859 and 1399.*) There shall be paid to the provincial treasurer, or in the Moro Province to the district treasurer of the proper district, a fee of two Philippine pesos for each declaration of location of a mining claim and for each affidavit accompanying such declaration, and for each document or instrument in writing, of whatever character or nature, alienating, mortgaging, leasing, or otherwise affecting the possession of mining claims or any right or title thereto or interest therein, filed for record, and on the presentation of the receipt of the provincial or district treasurer the said declaration, affidavit, or other document or instrument in writing shall be recorded by the mining recorder, provided all requirements of the law before recording shall have been complied with. These fees shall be accounted for as other collections of the officers receiving them, and deposited for the credit of the proper province or district, in accordance with section six of Act Numbered Six hundred and twenty-four.

SEC. 6. The fees collected by authority of the preceding section shall be turned into the treasury of the province in which the mining claim for the recording of which said fees may be paid is situate, or in provinces or districts where civil government has not been established into the office of the Collector of Internal Revenue.

SEC. 7. The books necessary for the recording of mining claims shall be provided by the provincial authorities of the respective provinces, or in provinces or districts where civil government has not been established, by the Chief of the Bureau of Public Lands.

SEC. 8. In addition to the requirements of sections twenty-three and twenty-four of the Act of Congress approved July first, nineteen hundred and two, in

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regard to placing posts numbers one and two on the line of location, and marking the line between them, each locator of a mineral claim shall establish each of the four corners of the claim by marking a standing tree or rock in place, or by setting in the ground, where practicable, a post or stone. Each corner shall be distinctly marked to indicate that it is the northeast, southeast, southwest, or other corner, as the case may be, of the claim in question; and the posts or stones used to mark such corners shall be of the dimensions required by these regulations for posts and stones marking corners or angles of a placer claim.

SEC. 9. The locator of a placer claim shall post upon the same a notice containing the name of the claim, designating it as a placer claim, the name of each locator, the date of the location, and the number of hectares claimed. He shall also define the boundaries of the claim by marking a standing tree or rock in place, or by setting a post or stone at each corner or angle of the claim. When a post is used it must be at least five inches in diameter or four inches on each side by four feet six inches in length, and, where practicable, set one foot in the ground and surrounded by a mound of earth or stone four feet in diameter by two feet in height. When a stone, not a rock in place, is used, it must be not less than six inches on each side by two and one-half feet in length, and must be set so as to project half its length above the ground. Where a stone, a rock in place, is used, a cross must be cut in the stone, the arms of which cross must be at least four inches long, intersecting, approximately, at right angles and in their centers, the cutting to be at least one-half inch deep. The intersection of the arms shall contitute the corner. Each tree, rock in place, stake, or stone used to designate a corner or angle of a placer claim must be so marked as to clearly indicate its purpose, and the objects selected to designate the corners of a claim shall be marked with a series of consecutive numbers, thus: "Cor. No. 1," "Cor. No. 2." "Cor. No. 3," and so forth: *Provided*, That nothing in this section shall be understood to require the establishment and marking of any corner or angle of a placer claim located upon surveyed public lands at a point where a corner of the Philippine system of public-land surveys has previously been established, in which case it shall suffice in describing said claim for record to correctly describe said corner of the public surveys, and to state that such corner stands for corner number one, corner number two, or corner number three, and so forth, as the case may be, of such placer claim.

SEC. 10. Within thirty days after the location thereof every locator of a placer claim shall record the same with the mining recorder of the province or district in which the claim is situate.

SEC. 11. The record of a placer claim shall consist of a declaration of location reciting all the facts necessary to a perfect identification of the claim, and shall contain a true copy of the notice posted thereon at the date of location, as well as a description of the claim as staked and monumented, showing the length and approximate compass bearing, as near as may be, of each side or course thereof, and stating in what manner the respective corners are marked, whether by a standing tree, rock in place, post, or stone, and giving in detail the distinguishing marks that are written or cut on each, and also stating as accurately as possible, preferably by course and distance, the position of the claim with reference to some prominent natural object or permanent monument.

SEC. 12. No placer claim shall be recorded unless the declaration of location be accompanied by an affidavit made by the applicant or some person on his behalf cognizant of the facts, that the notice required by section nine of these regulations has been posted upon the claim, and that the ground thereby embraced is valuable for placer mining purposes; that the ground applied for is unoccupied by any other person.

SEC. 13. No mining claim shall be recorded unless the declaration be accompanied by proof that the locator, or each of them in case there be no more than one, is a citizen of the United States of America or of the Philippine Islands. The proof of citizenship required by this section may be that set forth in section thirty-five of the Act of Congress approved July first, nineteen hundred and two.

SEC. 14. If at any time the locator of any mining claim heretofore or hereafter located, or his assigns, shall apprehend that his original notice or declaration was defective, erroneous, or that the requirements of the law had not been complied with before recording, or shall be desirous of changing his boundaries so as to include ground not embraced by the location as originally made and recorded, or in case the original declaration of location was made prior to the promulgation of these regulations, and the locator or his assigns shall desire to

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conform the location and declaration hereto, such locator or his assigns may file an amended declaration of location in accordance with the provisions of the Act of Congress of July first, nineteen hundred and two, and these regulations, with the mining recorder of the province or district in which such claim is situate: *Provided*, That such amended declaration of location does not interfere at the date of its filing for record with the existing rights of any person or persons, and no such amended location or the record thereof shall preclude the locator or his assigns from proving any such title as he or they may have held under the original location.

SEC. 15. Within sixty days after the expiration of the period fixed by law for the annual performance of the labor or the making of improvements upon a mining claim, the locator thereof, or some person on his behalf cognizant of the facts, shall make and file for record with the mining recorder of the province or district in which the claim is situate an affidavit in substance as follows:

AFFIDAVIT OF ANNUAL ASSESSMENT WORK.

PHILIPPINE ISLANDS.

Province of }
District of }----------

----------, being first duly sworn, deposes and says that he is a citizen of the United States of America (or of the Philippine Islands, as the case may be) and more than twenty-one years of age; that he resides in ----------
province of }
district of }----------, P. I., and is personally acquainted with the mining claim known as the ---------- (lode or placer) claim, situate in the barrio of ----------, Province of ----------, island of ----------, P. I., the declaration of location of which is recorded in the office of the mining recorder of said province (or district), in book ---------- of Record of Mining Claims, at page ----------; that between the ---------- day of ----------, 190 , and the ---------- day of ----------, 190 , not less than ---------- dollars' worth of labor was performed or improvements made upon said claim, not including the work done prior to the date of recording the same. Such work was done or improvements made by and at the expense of ----------, the owner of said claim, for the purpose of complying with the laws of the United States relating to annual assessment work, and ----------
(here name the miners or other persons who did the work) were the persons employed by said owner who did such work or made such improvements, and that said work or improvements consisted of and are described as follows, to wit:

---------- (here describe the work done).

(Signature) ----------

Subscribed and sworn to before me this ---------- day of ----------, 190 .

(Signature of officer who administers oath.)

Such affidavit, when recorded, shall be prima facie evidence of the performance of such labor or the making of such improvements, and shall be received in evidence by all courts in the Philippine Islands, as shall also the record thereof or a certified copy of the same.

SEC. 16. Actual expenditures and cost of mining improvements by the claimant or his grantors, having a direct relation to the development of the claim, shall be included in the estimate of assessment work. The expenditures may be made from the surface, or in running a tunnel, drifts, or crosscuts for the development of the claim. Improvements of any other character, such as buildings, machinery, or roadways, must be excluded from the estimate unless it is clearly shown that they are associated with actual excavations, such as cuts, tunnels, shafts, and so forth, are essential to the practical development of and actually facilitate the extraction of mineral from the claim.

SEC. 17. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 18. This Act shall take effect on its passage.

Enacted, February 7, 1903.

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[No. 1128.]

An Act Prescribing regulations governing the procedure for acquiring title to public coal lands in the Philippine Islands, under the provisions of sections fifty-three, fifty-four, fifty-five, fifty-six, and fifty-seven of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Any person above the age of twenty-one years, who is a citizen of the United States or of the Philippine Islands, or who has acquired the rights of a native of said Islands under and by virtue of the Treaty of Paris, or any association of persons severally qualified as above, may purchase any unreserved, unappropriated public land which is chiefly valuable for coal by proceeding as hereinafter directed: *Provided*, That no individual person shall be entitled to purchase more than sixty-four hectares and no association more than one hundred and twenty-eight hectares: *And provided further*, That this Act shall be held to authorize but one entry by the same person or association of persons, and no association of persons, any member of which shall have taken the benefit of this Act, either as an individual or as a member of any other association, shall enter or hold any other lands under the provisions hereof, and no member of any association which shall have taken the benefit of this Act shall enter or hold any other lands under the provisions hereof: *And provided further*, That such lands, if previously surveyed by the Government, shall be taken by legal subdivisions, but if unsurveyed shall be taken, wherever possible, in the form of squares which shall contain at least sixteen hectares each.

SEC. 2. A coal claim may be initiated either by filing a declaration of location with the mining recorder of the province in which the land is located, or by actually taking possession of the land and making improvements thereon: *Provided, however*, That where claims are initiated by occupation, a proper declaration of location must be filed with the mining recorder within sixty days after the date of actual possession and commencement of improvements.

SEC. 3. The declaration of location above mentioned must be executed under oath, and must describe the land occupied in as definite a manner as practicable, and must contain all necessary allegations to show that applicant has the qualifications required under section one of this Act, and that the land is of the character therein mentioned. In case a right to purchase is based on prior occupation and improvement, that fact must be set out, and the date of occupation and amount of improvements stated.

SEC. 4. It shall be the duty of the mining recorder to record declarations of locations of coal claims in the same manner that declarations of locations of mining claims are recorded; and for such services he shall require the payment of a fee of two pesos, Philippine currency, which shall be paid to the provincial or district treasurer as provided in section five of Act Numbered Six hundred and twenty-four as amended by Act Numbered Eight hundred and fifty-nine.

SEC. 5. All declarations of locations shall be recorded in the order in which they are filed for record, and the mining recorder shall note on each instrument filed for record the year, month, and day, and the hour and minute of the day on which the same was filed. After recording the declaration, the mining recorder shall make a true copy of the same and without delay forward it to the Chief of the Bureau of Public Lands.

SEC. 6. All persons seeking to acquire public lands under the provisions of this Act must prove their respective rights and pay for the land filed upon within one year from the time prescribed for filing their claims, and they shall not take from the land and sell any coal prior to obtaining a patent.

SEC. 7. A patent for land claimed and located for valuable coal deposits may be obtained in the following manner: Any person or association authorized to locate a coal claim under this Act having claimed and located a piece of land for such purposes, who or which has complied with the terms of this Act, shall file with the Chief of the Bureau of Public Lands an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim made by or under the direction of the Chief of the Bureau of Public Lands, and at applicant's expense, showing accurately the boundaries of the claim, which shall be distinctly marked by monuments on the ground, and shall

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post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land described in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such plat and notice have been duly posted. Upon the filing of said application, plat, field notes, notices, and affidavits it shall be the duty of the Chief of the Bureau of Public Lands to publish once a week a notice that such application has been made, for the period of nine consecutive weeks, in a newspaper to be by him designated; also to post a copy of the application in his office, and to require such further publication as he, with the approval of the Secretary of the Interior, may deem advisable. At the expiration of the period of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed in the Bureau of Public Lands during the said period of publication, it shall be assumed that the applicant is entitled to a patent, upon payment to the Chief of the Bureau of Public Lands of fifty pesos per hectare where the land shall be situated more than fifteen miles from any completed railroad, available harbor, or navigable stream, and one hundred pesos per hectare for such lands as shall be within fifteen miles of such road, harbor, or stream, and that no adverse claim exists: *Provided*, That where the claimant for a patent is not a resident of or within the province wherein the land sought to be purchased is located, the application for patent and the affidavits required to be made in this section by the claimant for such patent may be made by his, her, or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits.

SEC. 8. Where an adverse claim is filed during the period of publication, it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filling of the affidavit thereof. shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment, and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment roll with the Chief of the Bureau of Public Lands, who, in case the conditions of section seven of this Act have been complied with, shall issue to the claimant a patent for such land as by the decision of the court he appears to be entitled to.

SEC. 9. All patents for lands disposed of under this Act shall be prepared in the Bureau of Public Lands and shall issue in the name of the United States and the Philippine Government under the signature of the Civil Governor; but such patents shall be effective only for the purposes defined in section one hundred and twenty-two of the Land Registration Act, and the actual conveyance of the land shall be effected only as provided in said section.

SEC. 10. The Chief of the Bureau of Public Lands, under the supervision of the Secretary of the Interior, shall prepare and issue such forms and instructions consistent with this Act as may be necessary and proper to carry its provisions into effect, and for the conduct of all proceedings arising hereunder.

SEC. 11. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-six, nineteen hundred.

SEC. 12. This Act shall take effect on its passage.

Enacted, April 28, 1904.

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BUREAU OF PUBLIC LANDS.

(Circular.)

COAL LAND LAW AND INSTRUCTIONS AND FORMS PERTAINING TO THE SAME, AUG. 22, 1904.

Laws.

Act No. 1128, Philippine Commission, an Act relating to the sale of public coal lands in the Philippine Islands, together with instructions and forms pertaining to same, are hereby published for the guidance of public officials in the administration of the law and for the information of the public.

[No. 1128]

An Act Prescribing regulations governing the procedure for acquiring title to public coal lands in the Philippine Islands, under the provisions of sections fifty-three, fifty-four, fifty-five, fifty-six, and fifty-seven of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act Temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes."

(See pages 497–498.)

Instructions and forms.

Under the authority conferred by section 10, supra, the following instructions and forms are issued:

1. Land which may be purchased.—Any unclaimed public land containing valuable deposits of coal is subject to sale under the provisions of this Act. Prospective purchasers will be required to show by affidavit that the land sought to be purchased contains such valuable deposits.

2. Who may purchase.—The following-described persons are entitled under the law to purchase public coal land:

(*a*) Citizens of the United States over the age of twenty-one years.

(*b*) Natives of the Philippine Islands or persons who have acquired the rights of natives by virtue of the treaty of Paris of December tenth, eighteen hundred and ninety-eight, and who are over the age of twenty-one years.

(*c*) Associations of persons the members of which are severally qualified as above.

3. Amount that may be purchased.—An individual may purchase any amount not exceeding sixty-four hectares. An association is limited to one hundred and twenty-eight hectares. A purchaser is entitled to make but *one* purchase of the maximum amount allowed.

4. Form in which land must be taken.—Where the land sought to be purchased has been previously surveyed under a regular governmental system of surveys dividing the territory into subdivisions, purchase must be made by such subdivisions. But where the land is unsurveyed, it must be taken when possible in squares which shall contain not less than sixteen hectares, but may contain any quantity in excess of sixteen hectares to the amount the purchaser is entitled to purchase.

5. Manner of locating a coal claim.—Any person qualified to purchase public coal land may initiate a claim to any particular tract by taking possession of

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same and within sixty days thereafter filing a declaration of location thereof with the secretary of the province in which the land is located. This declaration of location must be executed under oath and must give as definite a description of the land as it is possible to state without making a survey. (*Form No. 1 should be used.*)

In locating a claim locators should exercise great care in marking the corners of same, and should describe the corners with reference to some prominent natural object or landmark—as a tree or rock on the claim—that is, give the approximate direction and distance of each corner from said landmark. Declarations of location of coal claims are recorded in the same manner as like notices for other mining claims, and the same fees are charged. (See Act No. 624.)

The mining recorder will as soon as possible after recording a declaration of location of a coal claim forward a copy of same to the Chief of the Bureau of Public Lands.

6. Manner of acquiring title.—An application to purchase coal land must be filed with the Chief of the Bureau of Public Lands within one year from the date of filing a declaration of location therefor with the mining recorder.

The first step in the procedure for acquiring title is the filing with the Chief of the Bureau of Public Lands of an application for survey of the land. (*Form No. 2 should be used in making this application.*) The survey is made under the directions of the Chief of the Bureau of Public Lands, at applicant's expense. The Government will take no action on an application for survey until the estimated cost of making same is deposited with the Chief of the Bureau of Public Lands.

After a claim has been properly surveyed and claimant has received a plat thereof and the field notes of survey, he should file his application for a patent (*using form No. 3*), together with a copy of the plat and field notes of survey, with the Chief of the Bureau of Public Lands. On the same date as that of his application for a patent claimant should post in a conspicuous place on the claim a notice of his application for a patent (*using form No. 4*), together with a copy of the plat of the claim, and should forward to the Chief of the Bureau of Public Lands an affidavit executed by two disinterested persons showing that said notice and plat have been posted. (*Form No. 5 should be used in executing this affidavit.*)

At the expiration of nine weeks from the date of posting said notice and plat, the applicant will file another affidavit with the Chief of the Bureau of Public Lands showing that said notice and plat have been posted on the claim for a period of nine weeks. (*Form No. 6 should be used in executing this affidavit.*)

Where the claimant for a patent is not a resident of or within the province wherein the land sought to be purchased is located, the application for patent and the affidavits required to be made by the claimant for such patent may be made by his, her, or its authorized agent, where said agent is conversant with the facts sought to be established by said affidavits.

The Chief of the Bureau of Public Lands will cause a notice to be published in the newspapers in which official notices are published, calling attention to each application for a patent, and will cause a like notice to be posted in the office of the secretary of the province in which the land is located. Said notices will be published for a period of nine weeks.

7. Value of coal lands.—The price per hectare is fifty pesos, Philippine currency, where the land is situated *more* than fifteen miles from any completed railroad, available harbor, or navigable stream, and one hundred pesos, Philippine currency, per hectare where the land is within fifteen miles of such railroad, harbor, or stream. Purchasers will be required to deposit the purchase price with the Chief of the Bureau of Public Lands at the time of filing the application to purchase.

8. Adverse claims.—Any person claiming an interest in land adverse to the interest sought to be acquired by an applicant for a patent thereto, must file a notice of such claim with the Chief of the Bureau of Public Lands prior to the expiration of the period of publication of the notice of application for patent above mentioned. And such person must, furthermore, within thirty days after filing said notice with the Chief of the Bureau of Public Lands, commence proceedings in a court of competent jurisdiction to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment; and a failure so to do will constitute a waiver of said adverse claim. (See sec. 8, Act No. 1128.)

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9. Prospecting.—The land may be thoroughly prospected and coal necessary for tests may be removed for that purpose, but none may be sold or used commercially prior to issuance of patent.

10. Timber.—A gratuitous license to cut and use timber for mining purposes may be had on application to the Bureau of Forestry. Said license will be limited to the claim on which the timber is cut. (See sec. 17, Act No. 1148.)

Manila, P. I., June 10, 1904.

P. S. BLACK,
Acting Chief Bureau of Public Lands.

Approved August 22, 1904:

DEAN C. WORCESTER, *Secretary of the Interior.*

Forms for use in proceedings to acquire title to public coal lands.

FORM No. 1.

Declaration of location of coal claim.

The undersigned hereby declares and gives notice that under the provisions of Act No. 1128, Philippine Commisson, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, the boundaries of which are more particularly described as follows, to wit: (Here give as definite a description as possible of the boundaries of the claim, having reference to monuments erected on the ground.) and _____ further declares that _____ is over the age of twenty-one years and is a citizen of the United States (or of the Philippine Islands) and has never held nor purchased any land under the provisions of said Act, either as an individual or as a member of an association; that said land is unoccupied by any other person, and contains valuable deposits of coal, and that _____ took possession of the same on the __ day of _____, A. D. 19__, and has made improvements consising of_____

_____

(Signed) _____,
Locator.
(Post-office) _____

Subscribed and sworn to before me this __ day of _____, 19__.

(Signature of official) _____
(Official title.)

NOTICE.—Where a claim is located by an association, it will be necessary for the locator to show that the several members of the association are each qualified to make a location.

FORM No. 2

Application for survey of coal claim.

_____, 19__.

To the CHIEF OF THE BUREAU OF PUBLIC LANDS,
Manila, P. I.

SIR: In compliance with section 7, Act No. 1128, Philippine Commission, I hereby make application for an official survey of a coal claim located by _____ in the barrio of _____, municipality of _____, Province of _____, and request that you will send me an estimate of the amount to be deposited in payment therefor, and after such deposit shall have been made, you will cause the said claim to be surveyed.

Respectfully, _____.

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FORM No. 3.

Application for patent for coal land.

To the CHIEF OF THE BUREAU OF PUBLIC LANDS,
Manila, P. I.

SIR: I _____, hereby apply, under the provisions of Act No. 1128, Philippine Commission, an Act relating to the sale of public coal lands in the Philippine Islands, to purchase _____ hectares of coal land located in the barrio of _____, municipality of _____ _____, Province of _____, and more particularly described as follows, to wit:

(Here give full description.)

_____

_____,

which description is set forth in the official field notes of survey of said tract hereto attached, dated _____, and the official plat of survey, a copy of which is filed herewith; there is hereby tendered _____ pesos in payment for said land; and I solemnly swear that I am over the age of twenty-one years, a citizen of the United States (or of the Philippine Islands), and have never held nor purchased lands under said Act either as an individual or as a member of an association; and I do further swear that I am well acquainted with the character of said described land, having frequently passed over same; that my knowledge of said land is such as to enable me to testify understandingly with regard thereto; that no portion of said land is in the possession or occupation of any other person, and that it contains valuable deposits of coal and is chiefly valuable therefor; that I located said land as a coal claim on the ___ day of _____, _____, and filed my notice of location with the mining recorder of the Province of _____ on the __ day of _____, ____.

(Signed) _____,
(Address) _____
(Date) _____

Subscribed and sworn to before me this __ day of _____, A. D. 19__.
(Signature of official) _____.
(Official title.)

N. B.—Where the applicant for a patent is an association, evidence must be submitted showing that the members of the same are severally qualified to purchase.

FORM No. 4.

Notice of Application for Patent for Coal Land.

Notice is hereby given that in pursuance of the provisions of Act No. 1128, Philippine Commission, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, and has made application for a patent for said claim, which is more fully described as to metes and bounds by the official plat herewith posted and by the field notes of survey thereof, now filed in the Bureau of Public Lands, which field notes of survey describe the boundaries and extent of said claim on the surface as follows, to wit: (Here give full description.)

Any and all persons claiming adversely the said described land, or any portion thereof, are hereby notified that unless their adverse claims are duly filed according to law within nine weeks from the date hereof with the Chief of the Bureau of Public Lands at Manila, P. I., said claims will not be considered by the Government.

(Name of claimant) _____,
(Post-office) _____

Dated on the ground this __ day of _____, A. D. 19__.

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FORM No. 5

Proof of Posting Notice and Plat on Coal Claim.

PROVINCE OF _____, MUNICIPALITY OF _____ _____ and _____ _____, each for himself, and not one for the other, being first duly sworn according to law, deposes and says, that he is over the age of twenty-one years, and was present on the _____ day of _____, A. D., 19__, when a plat representing the _____ coal claim, and certified to as correct by the Chief of the Bureau of Public Lands, and designated by him as Coal Claim No. _____, together with a notice of the intention of _____ _____ to apply for a patent for said claim and premises so platted, was posted in a conspicuous place upon said claim, to wit: Upon a _____, where the same could be easily seen and examined; the notice so conspicuously posted upon said claim being in words and figures as follows, to wit:

NOTICE OF APPLICATION FOR PATENT FOR COAL LAND.

Notice is hereby given that in pursuance of the provisions of Act No. 1128, Philippine Commission, _____ has located a coal claim in the barrio of _____, municipality of _____, Province of _____, and has made application for a patent for said claim, which is more fully described as to metes and bounds by the official plat herewith posted and by the field notes of survey thereof now filed in the Bureau of Public Lands, which field notes of survey describe the boundaries and extent of said claim on the surface as follows, to wit: (Here give full description.)

Any and all persons claiming adversely the said described land or any portion thereof so described, are hereby notified, that unless their adverse claims are duly filed according to law within nine weeks from the date hereof with the Chief of the Bureau of Public Lands at Manila, P. I., said claim will not be considered by the Government.

(Name of claimant) _____,
(Post-office) _____

Dated on the ground this _____ day of _____, A. D., 19__.

Witness:

_____
(Name.)

_____
(Address.)

_____
(Name.)

_____
(Address.)

Subscribed and sworn to before me, this _____ day of _____, A. D., 19__.

(Signature of official) _____
(Official title.)

FORM No. 6.

Proof that Plat and Notice Remained Posted on Claim During Period of Publication.

_____, a resident of the town of _____, Province of _____, deposes and says that he is over the age of twenty-one years, and that he is acquainted with the coal claim of _____, particularly described as follows, to wit: _____: that the official plat of such claim, designated as such by the Chief of the Bureau of Public Lands, together with a notice of intention to apply for a

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patent therefor, was posted thereon on the _____ day of _____, A. D. 19__, as fully set forth and described in the affidavit of _____ _____ and _____, dated the _____ day of _____, A. D. 19__, which affidavit was duly filed in the Bureau of Public Lands at Manila, P. I.; and that the plat and notice so mentioned and described remained continuously and conspicuously posted upon said coal claim from the _____ day of _____, A. D. 19__, to the _____ day of _____, A. D. 19__, including the nine weeks' period during which notice of said application for patent was published in the newspaper.

_____

Subscribed and sworn to before me this _____ day of _____, A. D. 19__.

(Signature of official)_____
(Official title.)

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BUREAU OF PUBLIC LANDS.

CIRCULAR CONTAINING THE LAWS AND INSTRUCTIONS CONCERNING THE LEASING OF PUBLIC LANDS, ISSUED NOVEMBER 7, 1904.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC LANDS,
Manila, P. I., October 11, 1904.

The following compilation of laws and instructions relative to leasing the public lands are issued under authority of section sixty-nine of "the public land act," act No. 926, for the information of the public and the guidance of public officers engaged in the administration of the laws.

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

SEC. 13. (See page 451.)
SEC. 75. (See page 461.)

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER III.—*Leases of portions of the public domain.*

Sections 22 and 31 inclusive (see pages 465, 467).

The civil governor was advised by the chief of the Bureau of Insular Affairs, Washington, D. C., by cablegram dated May 4, 1904, that Congress had adjourned without amending or disapproving the public land act (act No. 926). On July 26, 1904, the civil governor issued his proclamation declaring the public land act to be in full force and effect from said date, as contemplated by section 13, Act of Congress of July 1, 1902, above stated.

Instructions.

LANDS SUBJECT TO LEASE.

All unoccupied, unreserved, nonmineral public lands, more valuable for agricultural than forestry uses, are subject to lease. Public lands are such lands of the government as are subject to disposal under general laws. Mineral lands are such lands as are chiefly valuable for the minerals they contain. Whether lands upon which there is growing timber are more valuable for agricultural than for forestry uses will be determined by the forestry bureau. (See sec. 18, act of Congress of July 1, 1902.)

Owing to the system of disposing of public lands which obtained under the Spanish Government in these islands, the present government has no maps showing the exact location of public lands; therefore, prospective lessees will be compelled to make inquiries as to the ownership of any particular tract desired of persons living in the vicinity thereof, and to consult the property register and record of tax returns, in the capital of the province in which the land is located, for evidence of ownership.

No lease will be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claims shall be legally extinguished.

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The provisions of the public land act relating to leasing public lands do not extend, at the present time, to the provinces of Lepanto-Bontoc, Benguet, Paragua, Nueva Vizcaya, and the Moro Province, but may at any time, by resolution of the Philippine Commission, be extended to said provinces.[a]

PERSONS WHO MAY LEASE PUBLIC LANDS.

(1) Citizens of the Philippine Islands; (2) citizens of the United States; (3) citizens of any insular possession of the United States; (4) any corporation or other association of persons organized under the laws of the Philippine Islands or of the United States, or of any State, Territory, or insular possession thereof, authorized by the laws of its creation and by the laws of the Philippine Islands and the acts of Congress applicable thereto to transact business in the Philippine Islands. In this connection see section 75, act of Congress of July 1, 1902, supra, as to rights of corporations.

AMOUNT THAT MAY BE LEASED.

A qualified person may lease any amount not exceeding 1,024 hectares, equivalent to about 2,530 acres.

PERIOD OF LEASE.

Leases shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years.

RENT.

Lessees will be required to pay an annual rent in advance, the amount of which will be fixed by the chief of the bureau of public lands, with the approval of the Secretary of the Interior, but it can in no case be less than 50 centavos, Philippine currency, per hectare, and during the second period can not exceed ₱1.50 per hectare. The first payment of rent is due on the date of the execution of the lease, and must be paid before the lease is delivered.

FORM IN WHICH LEASED LANDS MUST BE TAKEN.

Leased lands, in all cases where possible, must be taken in tracts compact in form as provided in section 23 of the public land act. Tracts to be contiguous must have one boundary in common. The purpose of this provision is to prevent the taking of land in long or irregular strips whereby adjoining public lands would be decreased in value.

PROCEDURE IN MATTER OF OBTAINING LEASE.

Prospective lessees are required to file an application for the land desired with the chief of the bureau of public lands. This application must show that the applicant is qualified to lease public lands; must describe the land desired to be leased, with respect to both its location and character, as definitely as practicable, and must be executed under oath. A proper form to be used in making application will be furnished on request by the bureau of public lands.

Applicants must give notice of intention to apply for a lease by publication for thirty days in two newspapers, one English and one Spanish. Said newspapers shall be of general circulation in the locality where the land is located. When the notice is published in a weekly newspaper, five consecutive insertions are necessary; when in a daily newspaper, the notice must appear in each issue for thirty-one consecutive issues. Said notice shall state the date when said application will be made, and shall describe as definitely as possible the land to be applied for; an approved form may be found at the close of this circular. Applicant must file a copy of the notice at the same date at which he begins the publication of same with the provincial secretary and municipal president of the province and municipality in which the land is located. In case the land is located within the city of Manila, said notice must be filed with the secretary of the municipal board.

[a] See pages 475, 476.

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Applicant must submit to the chief of the bureau of public lands with his application a copy of said notice, and must show by affidavit of the manager of the newspaper in which same was published that it was published for the required period.

The application will be examined in the bureau of public lands, and if found correct will be referred to the forestry bureau for report as to whether the land is more valuable for agricultural than for forestry purposes.

Upon return of the application to the bureau of public lands from the forestry bureau, with a report that the land is more valuable for agricultural than forestry uses, the chief of the bureau of public lands will, with the approval of the Secretary of the Interior, fix the rate per hectare at which the government will lease the land. He will then advise the applicant of the rate fixed, also of the probable cost of surveying the tract.

Upon deposit by applicant in the bureau of public lands of the amount of the estimated cost of survey the chief of said bureau will advise applicant of the date when he will cause the survey to be made, and will also send a copy of said notice to the secretary of the province and one to the president of the municipality in which the land is located, requesting said officials to post said notices in a conspicuous place in their respective offices.

Upon completion of the survey, in case there are no adverse claims to the land, a lease will be executed therefor as early as practicable.

MISCELLANEOUS.

A lessee of public lands has no right to remove timber except as authorized by the forestry bureau.

No minerals may be removed from public lands under a lease. In case it is made to appear that leased lands contain valuable mineral deposits, the chief of the bureau of public lands, with the approval of the Secretary of the Interior, is authorized to cancel the lease as to such lands.

Attention is invited to the fact that section 77 of the public land act prescribes a penalty for the presentation of false proof or affidavits in connection with applications or claims respecting public lands.

All necessary forms to be used in connection with the leasing of public lands may be had on application to the bureau of public lands.

WILL M. TIPTON,
Chief Bureau of Public Lands.

Approved, November 7, 1904.
DEAN C. WORCESTER,
Secretary of the Interior.

NOTICE OF APPLICATION TO LEASE PUBLIC LANDS.

The undersigned hereby gives notice that he will on the_____ day of_____, 19__, file with the chief of the bureau of public lands, Manila, P. I., an application for a lease to the following described public land, beginning_____
_____ _____

[Here give description as definitely as possible.]

_____ _____
_____ _____
located in the barrio of_____, municipality of_____, province of_____, and containing_____hectares, more or less.
Signature of applicant_____
Post-office address_____

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS,

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM No. 11.

Lease Application.

(BY AN INDIVIDUAL.)

BUREAU OF LANDS No. _____ Local Land Office No. __

1. The undersigned hereby makes application under the provisions of Chapter III of The Public Land Act No. 926 to lease, for the period of _____ years, the following tract of land, viz (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any): situate in the barrio of _____, Municipality of _____, Island of _____, Province of _____, Philippine Islands, and containing an area of _____ hectares _____ ares and _____ centares; said tract being as nearly as practicable rectangular in shape and not more than 800 meters in length, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. My name is _____; my age is _____ years; the place of my birth was _____; I am a citizen of _____; and my postoffice address is_____.

4. I have been upon and examined the land applied for, and it contains no improvements or indications of settlement or cultivation, and to the best of my knowledge, information, and belief the land is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

5. If I am awarded a lease of the land I will reimburse the Government the cost of survey, and I will sign and execute a contract of lease for said land containing the provisions and conditions required and provided by law and by the rules and regulations governing the leasing of agricultural public lands.

_____
(Signature of applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF_____ }
MUNICIPALITY OF_____ } ss.

6. I, _____, the person making this application, first being duly sworn, upon my oath depose and say: That I have read or have had read to me and thoroughly understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who administered the oath; that each and every statement in said application is true and correct. So help me God.

_____

7. Before me at the place aforesaid, on this _____ day of _____, 19__, personally appeared _____, personally known to me to be the person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to this affidavit.

8. The affiant exhibited to me his cedula, which was No. _____, issued at _____ on the _____ day of _____, 19__, which showed him at the date of said cedula to be _____ years of age, and a native of _____

To all of which I certify.

{Here attach a 20-centavo documentary stamp.}

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required)

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BUREAU OF LANDS.

SALES CIRCULAR

Containing

Chapter II of the Public Land Act, providing for sales of portions of the public domain, and instructions and forms pertaining thereto, Issued November 23, 1905.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF PUBLIC LANDS,
Manila, October 18, 1905.

SIR: I have the honor to submit herewith for your consideration and approval, if found satisfactory, instructions governing the sale of public lands, as provided in Chapter II, Act No. 926, Philippine Commission, issued in compliance with the requirements of section 69 of said act. A copy of said Chapter II, with a copy of section 75, act of Congress approved July 1, 1902 (32 U. S. Stat., 691), and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and copies of the forms to be used in connection with the purchase of lands under this chapter, are attached hereto.

Very respectfully,

J. W. ANDERSON,
Acting Chief, Bureau of Public Lands.

The Honorable SECRETARY OF THE INTERIOR, *Manila.*

Approved, November 23, 1905:
DEAN C. WORCESTER, *Secretary of the Interior.*

Instructions relative to the sale of Public Lands.

The following instructions, under Chapter II of the Public Land Act (No. 926), providing for the sale of public lands, are promulgated, under section 69 of said act, for the information of those concerned. As a supplement hereto will be found a copy of Chapter II of said act, with section 75 of the act of Congress approved July 1, 1902 (32 U. S. Stat., 691), and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and copies of the forms to be used in the purchase of lands under said chapter:

(1) **Land which may be purchased and by whom.**—Unoccupied, unappropriated, and unreserved nonmineral agricultural public land may be purchased by individuals, by copartnerships, and by corporations and like associations. An individual, in order to be qualified to purchase, must be a citizen of the Philippine Islands or of the United States or of some of the insular possessions of the United States. A copartnership, in order to be qualified to purchase, must be composed exclusively of individuals having citizenship. A corporation or like association must be organized under and according to the laws of the Philippine Islands or of the United States or some State, Territory, or insular possession of the United States.

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(2) Area which may be purchased.—An individual may purchase not more than sixteen hectares of land. A copartnership may not purchase a greater quantity of land than sixteen hectares for each partner. A corporation or like association may purchase not more than one thousand and twenty-four hectares.

(3) Relative to corporations.—Every corporation authorized to engage in agriculture must be restricted by its charter to the ownership and control of not more than one thousand and twenty-four hectares of land. (Sec. 75, act of July 1, 1902, 32 U. S. Stat., 691.)

A corporation organized in any State of the United States or its Territories or insular possessions—that is, any corporation organized outside of the Philippine Islands—is a foreign corporation here, and must comply with the Philippine laws governing the transaction of business in these Islands by foreign corporations.

(4) Citizenship.—A citizen of the Philippine Islands is any inhabitant thereof who was a Spanish subject on April eleventh, eighteen hundred and ninety-nine, and then resided and has continued to reside in the Islands, and who did not make a declaration of his desire to retain his Spanish citizenship before some court of record, as provided by the treaty of Paris, and the protocol of April twenty-eighth, nineteen hundred. The children and descendants of the citizens described, born since April eleventh, eighteen hundred and ninety-nine, are also citizens of the Philippine Islands.

Persons of foreign birth who have served in the Army, Navy, or Marine Corps of the United States (which is equivalent to a declaration of intention to become a citizen), or who have declared their intention to become citizens of the United States, can not enter upon, or procure title to, public land in these Islands, and there is no court in the Islands authorized to confer citizenship upon the persons described.

(5) Location of public land.—The Spanish Government made no regular survey of the public domain, and the present Government has not yet authorized such a survey, so that neither the extent nor the location of the public lands is definitely known, and no map showing the location of the lands subject to sale can now be furnished. The only information as to the public or private ownership of a given tract may be obtained from the residents of the community in which the land is located, by consulting the records of the old "Registro de Propiedad" and the present register of deeds to see if the particular tracts about which information is sought have ever been registered. The land-tax assessment books of the provincial treasurer may show whether any taxes have been assessed against the land, and, if so, who claims it. The provincial treasurers will give prospective purchasers as much assistance as possible in locating the public lands.

(6) Form of tract.—All lands purchased by companies or corporations, whether previously surveyed or not, when the tract is of more than sixty-four hectares, must be taken, whenever it is possible, in contiguous squares of not less than sixty-four hectares each. But a purchaser of one or more tracts of sixty-four hectares may also take in connection therewith one rectangular tract of thirty-two hectares, provided the longer side of such smaller tract is contiguous to the square tract of sixty-four hectares, or to one of such sixty-four hectare tracts, if more than one is purchased.

Sales will not be made of land lying in such a manner as to give the purchaser control of any adjacent land, water, streams, shore line, way, roadstead, or other valuable rights to the prejudice of the interests of the public.

If application is made to purchase unsurveyed public land the tract must be in a single body, as nearly as practicable rectangular in form, and not more than eight hundred meters in length, when applied for by an individual.

(7) A purchaser may also make homestead.—An individual may purchase sixteen hectares of land and also enter a homestead, provided he complies with the law as to occupation, or residence, cultivation, improvement, and so forth, as to both tracts. The purchaser is required to occupy, cultivate, and improve the land. Such occupation may be by agent or by himself.

(8) Application; procedure to purchase.—Applications to purchase should be made on the blank forms printed and furnished by this Bureau for that purpose. A duplicate application need not be filed. These forms may be obtained upon request from this Bureau or from provincial treasurers who have been designated to act as local land officers.

If application be made by an individual it must be made under oath and give the citizenship of the applicant, his post-office address, the best possible description of the land applied for, that it is nonmineral in character, more valuable for agricultural than for forestry purposes, and does not contain

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deposits of coal or salts. Great care should be taken to fill out all blank spaces in the application. If application be made by a corporation, a certified copy of its charter or articles of incorporation must be filed. If made by an unincorporated association, it must show that each member is qualified to enter public lands, under this chapter.

It is not necessary to have land surveyed in order to describe it in the application, nor is it necessary to employ a draftsman to make the sketch map called for by the application blank. The description and sketch are only advisory to the land officials, but must be as full and complete as possible. A stake should be firmly set in the ground at each corner of the tract which it is desired to purchase, and the approximate distance between the stakes stated. The names of the adjoining landowners should be given, and if the land is near a road or stream of water the name and distance to such road or stream of water should be stated. There is no objection, however, if an applicant desires, to have the land surveyed and the plat made by an expert, but the applicant must bear the expense thereof. At the end of the application the sketch map should show the points of the compass; the boundaries and names of adjoining landowners; the length of each portion of the boundary, as nearly as practicable, in meters; all roads, streams of water, and any other natural objects with their names.

(9) **Sale ordered; appraisal; bids.**—After the application has been received and it has been determined from the report of the Director of Forestry that the land is more valuable for agricultural than forestry purposes, and the sale authorized by the Secretary of the Interior, the land will be appraised by this Bureau and advertisement made for sealed bids therefor. The applicant and any other qualified person or company may submit bids for the land. An individual will not be allowed to bid upon sixteen hectares or less embraced in the application of a corporation or other association of persons covering more than sixteen hectares. All bids must be sealed and addressed to the Director of Lands. Each bidder must inclose with his sealed bid a certified check or post-office money order made payable to the Director of Lands, or order, for twenty-five per centum of the amount of the bid. If, upon opening the bids, it is found that the highest price is offered by more than one bidder, and one of such bidders is the original applicant, the land will be awarded to the original applicant. If, however, the original applicant is not one of such bidders, then the land will be at once put up for oral bidding and awarded to the highest qualified bidder upon his depositing twenty-five per centum of the amount of his bid and making proper application for the land, if he has not already done so.

All bids will be opened at the time and place designated in the advertisement and the land awarded to the highest qualified bidder; and all bidders other than the original applicant, at the time of submitting their bids, must also submit an application to purchase the land described in the advertisement. The application should be inclosed with the bid and must be on file in this Bureau on the date of the opening of the bids. All bidders are entitled to be present at the opening of the bids, either in person or by agent, and, if by agent, such agent must have a power of attorney from the bidder he represents. The appraised value of the land, which must not be less than ten pesos per hectare, will be announced in the advertisement for bids, and any bid for less than the appraised value will not be considered.

(10) **Payment.**—The balance of purchase price of the land, after deducting the deposit made by the bidder, may be paid in full upon the making of the award, or in five equal annual installments, or in full at the expiration of five years from the date of the award. All sums of money remaining unpaid after the date of the award will bear interest at six per centum per annum, from such date until paid. Deposits of all unsuccessful bidders will be returned at once.

(11) **As to adverse occupant.**—If application is made to purchase agricultural public land, and such land is actually occupied by another person who is qualified to make a homestead or other entry thereof, or by any native who is entitled by law to a free patent, such person shall be personally served with notice as to his rights and allowed a preference right for one hundred and twenty days from the date of service of such notice in which to make entry or apply for patent. If such person does not avail himself of his rights, he must voluntarily vacate the land or he will be legally ejected.

(12) **Patent.**—Patent will not issue to a purchaser until five years from the date of the award, and during that five years the purchaser must occupy, cultivate, and improve the land, and when proof of such occupancy, cultivation, and improvement has been made he must also make affidavit that he has not sold the land, nor in any manner encumbered the title thereto.

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(13) Survey, payment for.—A survey and plat must be made before patent issues. If the purchaser be a corporation, like association, or an unincorporated company, and if the survey be made in advance of the regular survey of the Islands, the cost of the survey must be borne by the purchaser; if the purchaser be an individual, the cost will be borne by the Insular Government.

(14) Revenue stamp.—Paragraph six, section one hundred and sixteen, Act Numbered Eleven hundred and eighty-nine, requires that a twenty-centavo internal-revenue stamp be affixed to each certificate issued by an officer authorized to administer oaths. These stamps should be attached at the places indicated on the application.

(15) Penalty for false oath.—Section seventy-seven of The Public Land Act provides that any person who shall willfully and knowingly make false proof or a false affidavit in support of his application or claim respecting the lands of the Philippine Islands shall be deemed guilty of perjury and punished accordingly.

J. W. ANDERSON,
Acting Director of Lands.

Approved, November 23, 1905:
DEAN C. WORCESTER, *Secretary of the Interior.*

Act No. 926, Philippine Commission.

CHAPTER II.

SALES OF PORTIONS OF THE PUBLIC DOMAIN.

Sections 10 to 21 inclusive (see pages 463–465).
Proclaimed in force by Civil Governor July 26, 1904.

Section 75, Act of July 1, 1902 (32 U. S. Stat., 691).

SEC. 75. That no corporation shall be authorized to conduct the business of buying and selling real estate, or be permitted to hold or own real estate except such as may be reasonably necessary to enable it to carry out the purposes for which it is created; and every corporation authorized to engage in agriculture shall by its charter be restricted to the ownership and control of not to exceed one thousand and twenty-four hectares of land; and it shall be unlawful for any member of a corporation engaged in agriculture or mining and for any corporation organized for any purpose except irrigation to be in any wise interested in any other corporation engaged in agriculture or in mining. Corporations, however, may loan funds upon real-estate security and purchase real estate when necessary for the collection of loans, but they shall dispose of real estate so obtained within five years after receiving the title. Corporations not organized in the Philippine Islands, and doing business therein, shall be bound by the provisions of this section so far as they are applicable.

Forms Pertaining to the Public Lands.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM NO. S.

Sales Application.

(BY AN INDIVIDUAL.)

BUREAU NO_____ LOCAL LAND OFFICE NO_____

1. The undersigned hereby makes application to purchase the following-described tract of land under the provisions of Chapter II of The Public Land Act, No. 926, to wit: _____ situate in the barrio of _____ _____, municipality of _____, Island of _____,

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Province of _____, Philippine Islands, and containing an area of _____ hectares _____ ares and _____ centares; said tract being as nearly as practicable rectangular in shape and not more than 800 meters in length, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. My name is _____; my age is _____ years; the place of my birth was _____; I am a citizen of _____, and my post-office address is _____.

4. I have never heretofore purchased or otherwise acquired any land or interest therein under the provisions of The Public Land Act, except as follows: _____

5. If the land herein applied for is awarded to me, it is my intention to occupy, cultivate, and improve it, and said land will not be sold or in any manner encumbered prior to the issuance of the patent therefor. The provisions of the public-land laws relating to purchases of public land are understood and will be fully complied with by me.

6. I have been upon and examined the land applied for, and it contains no indications of settlement or occupation, and to the best of my knowledge, information, and belief it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

_____
(Signature of applicant.)

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____
MUNICIPALITY OF _____ } ss.

7. I, _____, the person making this application, first being duly sworn, upon my oath depose and say: That I have read or have had read to me and thoroughly understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who swore me; that each and every statement in said application is true and correct. So help me God.

_____

8. Before me, at the place aforesaid, on this _____ day of _____, 190 , personally appeared _____, personally known to me to be the person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to this affidavit.

9. The affiant exhibited to me his cedula, which was No_____, issued at_____ on the _____ day of _____, 190 , which showed him at the date of said cedula to be _____ years of age, and a native of _____

{Here attach a 20-centavo internal-revenue stamp.}

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

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FORM No. 9.

Sales application.

(By AN UNINCORPORATED COMPANY.)

BUREAU No_____ LOCAL LAND OFFICE No_____

1. The undersigned hereby makes application to purchase the following-described tract of land under the provisions of Chapter II of the Public Land Act, No. 926, viz: _____ situate in the barrio of _____, municipality of _____, Island of _____, Province of _____, Philippine Islands, and containing an area of _____hectares _____ ares and _____ centares; said tract conforming in shape to the requirements of section 11 of said Public Land Act, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. The unincorporated association or organization on whose behalf I make this application is composed of the following-named persons, the place of birth, citizenship, and post-office address of each being set opposite his name, to wit:

Name.	Place of birth.	Citizenship.	Post-office address.

4. The main office or principal place of busines of the company is at _____ and Mr. _____ is in charge thereof in the capacity of _____ A copy of the articles of agreement of the copartnership, association, or organization is attached hereto and made a part of this application. The retirement from the organization of any of the above-named members, or the addition thereto of any new members not hereinabove named, will be promptly reported to the Director of Lands at Manila.

5. The company in whose behalf I make this application has never purchased or acquired any interest in any land under the provisions of the Public Land Act, No. 926, except as follows:

_____

6. No member of said company has ever purchased or acquired any interest in any land under said Public Land Act, except as follows:_____

7. If the land herein applied for is awarded to said company, it is the intention of the members thereof to occupy, cultivate, and improve the same as required by law; and the land will not be sold or in any manner encumbered prior to the issuance of patent therefor. The provisions of the public-land laws relating to purchases of public land are understood and will be fully complied with by the applicant.

8. The authority of the undersigned to make this application is hereto attached, and the undersigned has been upon and examined the land applied for, and it contains no indications of settlement or occupation, and, to the best of his knowledge, information, and belief, it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

_____
(Signature of person swearing to application.)

_____
(Name of company which is the applicant.)

By _____

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AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ }
MUNICIPALITY OF _____ } ss.

9. I, _____, the person making this application for said company, first having been duly sworn, upon my oath depose and say: That I am the duly authorized agent of said company; that I signed said application and this affidavit in the presence of the officer who swore me; that each and every statement in said application is true and correct. So help me God.

_____

10. Before me, at the place aforesaid, on this the _____ day of _____, 190 , personally appeared _____, personally known to me to be the person whose name appears in the foregoing application, and in my presence signed said application and subscribed and swore to this affidavit.

11. The affiant exhibited to me his cedula, which was No_____, issued at _____ on the _____ day of _____, 190__, which showed him at the date of said cedula to be _____ years of age and a native of_____

{Here attach a 20-centavo internal-revenue stamp.}

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

FORM No. 10.

Sales Application.

(BY A CORPORATION.)

BUREAU No_____ LOCAL LAND OFFICE No_____

1. Application is hereby made to purchase the following-described tract of land under the provisions of Chapter II of The Public Land Act, No. 926, viz: _____, situate in the barrio of _____, municipality of _____, Island of _____, Province of _____, Philippine Islands, and containing an area of _____ hectares _____ ares and _____ centares; said tract conforming in shape to the requirements of section 11 of said Public Land Act, as indicated by the accompanying rough sketch.

2. To show that the qualifications required by law are possessed by the applicant, the following statement of facts is submitted:

3. The corporation on whose behalf this application is made is known as _____, and was organized under the laws of _____, and its principal place of business or main office is at _____, and Mr. _____ is in charge thereof in the capacity of _____. A certified copy of the charter or articles of incorporation, and the required documentary evidence showing that the law governing the transaction of business in the Philippine Islands by foreign corporations has been complied with, are hereto attached and made a part thereof.

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4. The corporation on whose behalf this application is made has never heretofore purchased any land or acquired any interest therein under the provisions of The Public Land Act, No. 926, except as follows: _____

5. No member of said corporation has ever purchased any land or acquired interest therein under said law, except as follows: _____

6. The land owned in the Philippine Islands by said corporation consists of the following tracts of the following areas, and the same is all the land owned by said corporation in the Philippine Islands, viz: _____

7. If the land herein applied for is awarded to said corporation, it is the intention of said corporation to occupy, cultivate, and improve the same as provided by law, and said land will not be sold or in any manner encumbered prior to the issuance of the patent therefor. The provisions of the public-land laws relating to purchases of public land by corporations, and the restrictions, limitations, and requirements of section 75 of the act of Congress of July 1, 1902, are understood and will be fully complied with by the applicant.

8. The undersigned has been upon and examined the land applied for, and it contains no indications of settlement or occupation, and, to the best of his knowledge, information, and belief, it is unoccupied, unreserved, unappropriated, nonmineral agricultural public land, contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

_____
(Signature of person swearing to application.)

_____
(Name of corporation making the application.)

By _____

AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ }
MUNICIPALITY OF _____ } ss.

9. I, _____, the person making this application for the corporation aforesaid, first having been duly sworn, upon my oath depose and say: That I have read and understand the foregoing application; that I signed said application and this affidavit in the presence of the officer who swore me; that I am duly authorized by said corporation to make this application on their behalf; that each and every statement in said application is true and correct. So help me God.

_____

10. Before me, at the municipality aforesaid, on this _____ day of _____, 190 , personally appeared _____, personally known to me to be the person whose name is signed to the foregoing application, and in my presence he signed said application and subscribed and swore to the foregoing affidavit.

11. The affiant exhibited to me his cedula, which was No. _____, issued at _____ on the _____ day of _____, 190 , which showed him at the date of said cedula to be _____ years of age and a native of _____

{ Here attach a 20-centavo internal-revenue stamp. }

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

12. SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

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Bid for Public Land.

The DIRECTOR OF LANDS,
Manila, P. I.

SIR: Referring to your advertisement in the _____ of _____ (date) _____, in which you call for bids for the public land described in Sales Application No_____, I have the honor to submit my bid of _____ ₱_____ per hectare, amounting to ₱_____ for said land.

I inclose herewith a _____ (money order or certified check) _____ for _____ ₱_____, which is twenty-five per centum of the amount of my bid.

_____
(Bidder.)

P. O. Address: _____

_____

(Bidders should carefully fill out this form and inclose it with the remittance in a sealed envelope. The envelope should be plainly marked "*Bid for public land described in Sales Application No.* _____," and addressed to the Director of Lands, Manila, P. I.

A formal application for the land should accompany this bid if one has not been submitted already.)

(No. 1404.)

An Act providing that provincial treasurers shall perform the duties of local land officers.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Provincial treasurers, under the direction of the Chief of the Bureau of Public Lands, and pursuant to section fifty-two of the Act of Congress approved July first, nineteen hundred and two, entitled "An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes," shall perform the duties of local land officers in their respective provinces. Each province shall constitute a land district.

SEC. 2. The Chief of the Bureau of Public Lands is hereby authorized to make such rules and regulations, subject to the approval of the Secretary of the Interior, as may be necessary and proper for the purpose of carrying the provisions of this Act into full force and effect.

* * * * * * *

SEC. 4. This Act shall take effect on its passage.

Enacted, October 13, 1905.

Notice to Applicants.

EXECUTIVE ORDER No. 31.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,
EXECUTIVE BUREAU,
Manila, June 29, 1906.

The attention of all concerned is invited to the following resolution adopted by the Philippine Commission on June twenty-six, nineteen hundred and six:

"Whereas it is believed that there are in the Philippine Islands many persons neither able properly to prepare applications for public land nor to pay for having such work performed; and

"Whereas, it is believed to be for the best interests of all concerned that such persons be assisted in preparing their applications to enter public land: Now, therefore,

"*Be it resolved*, that municipal secretaries shall hereafter be required, in addition to their other duties, to prepare, without charge, applications for public land in all cases where the application has reference to land located within the municipality, on the form printed for such purpose, for all persons who are unable to prepare such form."

All municipal secretaries are hereby required to comply with the foregoing resolution.

HENRY C. IDE,
Governor-General.

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BUREAU OF LANDS.

HOMESTEAD CIRCULAR

Containing

Chapter I of the Public Land Act providing for homesteading portions of the public domain and instructions and forms pertaining thereto issued April 1, 1906.

The following compilation of laws and instructions thereunder relative to the acquiring of public lands as a homestead, is issued under authority of section 69 of the Public Land Act, Act No. 926, United States Philippine Commission, for the information of the public and the guidance of public officials engaged in the administration of the laws.

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

SEC. 13. That the Government of the Philippine Islands, subject to the provisions of this Act and except as herein provided, shall classify according to its agricultural character and productiveness, and shall immediately make rules and regulations for the lease, sale, or other disposition of the public lands other than timber or mineral lands, but such rules and regulations shall not go into effect or have the force of law until they have received the approval of the President, and when approved by the President they shall be submitted by him to Congress at the beginning of the next ensuing session thereof and unless disapproved or amended by Congress at said session they shall at the close of such period have the force and effect of law in the Philippine Islands: *Provided*, That a single homestead entry shall not exceed sixteen hectares in extent.

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER I.

HOMESTEADS ON THE PUBLIC DOMAIN.

Sections 1 to 9 inclusive (See pages 462, 463).

On July 26, 1904, the Civil Governor issued his proclamation declaring the Public Land Act to be in full force and effect from that date, as contemplated by section 13, act of Congress of July 1, 1902, above mentioned.

ACT No. 1404.

AN ACT Providing that provincial treasurers shall perform the duties of local land officers.

(See page 517.)

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Instructions.

1. **Location of public lands.**—Owing to the system of disposing of public land which obtained under the Spanish Government in these Islands, the present Government has no maps showing the exact location of such lands; therefore prospective homestead settlers will be compelled to make inquiries, as to the ownership of any particular tract desired, of persons living in the vicinity thereof, and to consult the property register and record of tax returns, in the capital of the province in which the land is located, for evidence of ownership.

2. **Land subject to entry.**—Only unreserved, unoccupied, unappropriated agricultural public land is subject to homestead entry. Land chiefly valuable for the mineral it contains must be purchased under the law relating to mineral land. Whether a particular tract is more valuable for forestry than agricultural purposes will be determined by the Forestry Bureau on request of the Bureau of Lands.

On December 22 and 23, 1905, the Philippine Commission passed the following resolutions extending the provisions of the Public Land Act relating to homesteads to the territory therein mentioned which had theretofore been excepted from the operation of said provisions: [a]

The provisions of the Public Land Act relating to homesteads do not extend to the Provinces of Lepanto-Bontoc, Benguet, and Nueva Vizcaya.[a]

3. **Persons entitled to a homestead.**—The following designated persons are entitled to make a homestead entry:

(*a*) Citizens of the Philippine Islands.

(*b*) Citizens of the United States, or of any insular possession of the United States.

To be entitled to make an entry a person must be 21 years of age, or the head of a family. Any person, male or female, who is the head of a family, and otherwise qualified, may enter a homestead, even though such person be less than 21 years of age; but a married woman living with her husband is not entitled to make a homestead entry unless she is the head of the family—as where the husband is incapable of supporting himself and family by reason of bodily infirmity.

4. **Area of homestead and shape of tract.**—A homestead can not exceed 16 hectares in area, but any amount less than that may be entered. The approximate area of a tract of land is determined by multiplying the length in meters by the breadth in meters, which will give the area in square meters. Divide the area in square meters by 10,000, and the result will be the area in hectares. The first two figures of the remainder, if any, will be the number of ares, and the last two figures will be the number of centares.

Whenever land is sought to be acquired as a homestead which has been surveyed by the Government under some plan for subdividing the public lands, such land must be taken by legal subdivisions. In case an entry is made on unsurveyed land, the tract entered must be in a single body, as nearly as possible rectangular in shape, and not more than 800 meters in length.

5. **Procedure in making entry.**—An approved form on which to make application for a homestead entry may be obtained by addressing the provincial treasurer of the province in which the land is located, or the Bureau of Lands, Manila, P. I.

The approximate length, breadth, and area of the land must be stated. Dimensions must be given in meters, and the area in square meters or hectares. The dimensions and area should appear in paragraph 1 of the application and should also be indicated on the sketch map. If the dimensions and area are not given the application will not be accepted.

The land should be described in such a manner that a person not familiar with the country could, from the description, locate the particular tract applied for. Begin the description by locating the land with reference to some prominent or well-known land mark or a town, stream of water, lake, or church, giving the approximate distance the land lies from the mark selected; then describe the proposed boundary line by naming a point of beginning. State how the point is marked, as by a post, a pile of stones, or a blazed tree, giving the kind of post or tree. State in which direction the proposed boundary line runs from the point of beginning until the next corner is reached, tell how the corner is marked, and so on around to the point of beginning, always giving the

[a] See pages 474–476.

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direction that the proposed boundary line runs and how each corner is marked. If the proposed boundary line passes near any wellknown land mark or follows a stream of water, give the name of the land mark or stream.

The application should be filed with the provincial treasurer of the province in which the land is located, or with the Director of Lands, Manila, P. I.

Residence and cultivation.—The applicant must continuously reside upon and cultivate the land for a period of five years from the date of establishing his residence on the land after the entry is allowed, as provided in section 2, Act No. 926. Failure to reside on the land for a period of six months will constitute an abandonment of the entry and subject it to cancellation. But occasional visits to the land, once in six months or oftener, do not constitute residence. A claimant must actually reside upon the land and make it a home for himself and family, to the exclusion of a home elsewhere, as well as improve and cultivate it.

7. Contests and adverse claims.—Any person whether qualified to make a homestead entry or not, if he knows of any reason why an application should not be approved, or if any reason why an entry should be canceled, may initiate a contest against the applicant or entryman by filing an affidavit with the Director of Lands, wherein are set out the reasons why the application should be denied or the entry canceled. Upon the termination of a contest, if the application has been disapproved or the entry canceled, the person initiating the contest, if he is qualified under the law to enter a homestead, has a preference right of entry as to the land for sixty days from the date of the final decision on the contest.

8. Procedure to obtain patent.—At any time within three years after the expiration of the five years mentioned in paragraph 6, the applicant may submit proof showing that he has complied with the law in the matter of residence on the land and cultivation and improvement of same. An approved form on which to make this proof will be furnished by the Bureau of Lands. In case the proof is satisfactory a patent will issue.

9. Heirs of a homestead settler.—If the applicant is a married man, and should die after entry and before patent, his surviving widow, by complying with the requirements of the homestead law as to residence and cultivation, may submit proof of this fact and obtain the patent in her name. If the applicant be not married, and should die after entry and before patent, such of his heirs as by law could inherit real estate from him, by complying with the abovementioned requirements of the homestead law, may submit final proof and obtain the patent.

10. Surveys.—No homestead will be patented until the land has been surveyed and platted. The survey will be made as soon after the final proofs have been approved as it is possible for the surveyors to take up the work, and will be at the cost of the Government.

11. Fees.—The entry fee of ten pesos may be paid at any time after filing the application, but must be paid before entry is allowed. At the time of submitting final proof (see paragraph 8) and before patent will be, issued, the final fee of ten pesos must be paid. These are the only fees required by the Government under the homestead law, and may be paid to the Director of Lands, or to the officer designated as local land officer.

12. Miscellaneous.—Attention is invited to the fact that section 77 of the Public Land Act prescribes a penalty for the presentation of false proofs or affidavits in connection with applications or claims respecting public lands.

No land acquired as a homestead may be sold, by judgment of a court or otherwise, to satisfy any debt which may have been contracted by the applicant or patentee prior to the date of the patent therefor. (Sec. 4, Act No. 926.)

C. H. SLEEPER,
Director of Lands.

Approved, March 20, 1906:
DEAN C. WORCESTER,
Secretary of the Interior.

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THE GOVERNMENT OF THE PHILIPPINE ISLANDS,

DEPARTMENT OF THE INTERIOR,

BUREAU OF LANDS.

FORM No. 7.

Homestead Application.

BUREAU No. _____ LOCAL LAND OFFICE No. _____

1. I hereby make application to enter the following-described tract of land as a homestead, as provided in Chapter I of The Public Land Act, No. 926, to wit (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any): situate in the barrio of _____, Municipality of _____, Island of _____, Province of _____, Philippine Islands, containing an area of _____ hectares, _____ ares, and _____ centares; said tract being as nearly as practicable rectangular in shape and not more than eight hundred meters in length, as indicated by the accompanying rough sketch.

2. To show that I am entitled under the law to enter a Homestead on the tract above described, I submit the following statement of facts:

3. My name is _____; my age is _____ years; the place of my birth was _____; I am a citizen of _____, {by birth, by naturalization, by treaty,} and my post-office address is _____

_____

(If under 21 years of age, applicant must show that he or she is the head of a family.)

4. I have been upon and examined the land applied for, and it contains no indications of settlement or occupation, and to the best of my knowledge, information, and belief it is unoccupied, unreserved, unappropriated, nonmineral, agricultural public land; contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

5. I am not the owner of more than sixteen hectares of land in the Philippine Islands, and have not had the benefits of any gratuitous allotment of sixteen hectares of land since the acquisition of the Islands by the United States, nor have I made any other homestead entry. The full extent of my ownership and present interest in lands in the Philippine Islands is as follows:

_____

_____

6. This application is made for land for a homestead for my exclusive personal use and benefit, for the purpose of actual settlement, occupation, residence, and cultivation, and not, either directly or indirectly, for the use or benefit of any other person, persons, corporation, or association of persons.

7. I have read, or have had read to me, and understand the provisions of the Public Land Act relating to the entering and granting of homesteads on the Public Domain of the Philippine Islands, and I will faithfully and honestly endeavor to comply with all the requirements of law on the subject of homesteads.

8. In making this application for a homestead I am not acting as agent of any person, corporation, organization, or association; and I am not in collusion with any person, corporation, organization, or association to give them the benefits of the land entered, or any part thereof, or the timber thereon, or the minerals therein, and I am not entering said land for the purpose of speculation, but in good faith, to obtain a home for myself. I have not, directly or indirectly, made, and I will not make, any agreement or contract, in any way or manner, with any person or persons, corporation, or association whatsoever, by which any title which I may acquire from the Government will or may inure in whole or in part to the benefit of any person, persons, corporation, or association of persons.

_____

(Applicant.)

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AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ } ss.
MUNICIPALITY OF _____

9. I, _____, the applicant, first having been solemnly sworn, upon my oath depose and say: That I have read, or have had read to me, and thoroughly understand, the foregoing application; that I signed said application and this affidavit in the presence of the officer who administered the oath, and that each and every statement in said application is true and correct. So help me God.

_____

10. Before me at the Municipality aforesaid, on this _____ day of _____ A. D. 190 , personally appeared _____, to me personally known to be the same person whose name appears in the foregoing application, and in my presence he signed the said application and subscribed and swore to the foregoing affidavit.

11. The affiant exhibited to me his cedula, No. _____, issued at _____ _____, on _____, 190 , which showed him at the date of said cedula to be _____ years of age, a native of _____, and a _____ married man.

Here attach a 20-centavo internal-revenue stamp.

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

NOTE.—Any person who perverts the truth in the narration of facts contained in the foregoing application is guilty of the crime of falsification of a public document, and is punishable with the penaltes of presidio mayor, viz: Imprisonment from six years and one day to twelve years, and a fine of from 1,250 pesetas to 12,500 pesetas. (Art. 301, Penal Code).

The officer administering the oath will call the attention of the applicant to the foregoing.

12. SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

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BUREAU OF LANDS.

AGRICULTURAL PUBLIC LANDS

Circular containing

Instructions relative to the leasing of agricultural public lands and sections 13, 17, 18, and 75 of the Act of Congress approved July 1, 1902 (32 U. S. Stats., 691); Chapter III of The Public Land Act (Act No. 926 of the Philippine Commission); and Act No. 1404 of the Philippine Commission, issued May 1, 1906.

Instructions Relative to the Leasing of Agricultural Public Lands.

The following instructions under Chapter III of the Public Land Act, No. 926, providing for the leasing of agricultural public lands, are promulgated, under section 69 of said act, for the information of those concerned. As a supplement hereto will be found a copy of Chapter III of said act, with sections 13, 17, 18, and 75 of the act of Congress approved July 1, 1902, (32 U. S. Stats., 691), a form of notice of application to lease agricultural public land, and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers.

(1) Lands which may be leased.—All unoccupied, unreserved, nonmineral public lands, more valuable for agricultural than forestry uses, are subject to lease. Public lands are such lands of the Government as are subject to disposal under general laws. Mineral lands are such lands as are chiefly valuable for the minerals they contain. Whether lands upon which there is growing timber are more valuable for agricultural than for forestry uses will be determined by the Bureau of Forestry. (See sec. 18, act of Congress of July 1, 1902.)

(2) Amount which may be leased.—A qualified person may lease any amount not exceeding 1,024 hectares, equivalent to about 2,530 acres.

(3) Persons who may lease public lands.—(1) Citizens of the Philippine Islands; (2) citizens of the United States; (3) citizens of any insular possession of the United States; (4) any corporation or other association of persons organized under the laws of the Philippine Islands or of the United States, or of any State, Territory, or insular possession thereof, authorized by the laws of its creation and by the laws of the Philippine Islands and the acts of Congress applicable thereto to transact business in the Philippine Islands.

(4) Citizenship.—A citizen of the Philippine Islands is any inhabitant thereof who was a Spanish subject on April 11, 1899, and then resided and has continued to reside in the Islands, and who did not make a declaration of his desire to retain his Spanish citizenship before some court of record, as provided by the Treaty of Paris, and the protocol of April 28, 1900. The children and descendants of the citizens described born since April 11, 1899, are also citizens of the Philippine Islands.

Foreigners who have served in the Army, Navy, or Marine Corps of the United States (which is equivalent to a declaration of intention to become a citizen), or who have declared their intention to become citizens of the United States, can not enter upon or lease public land in the Islands, and there is no court in the Islands authorized to confer citizenship upon the persons described.

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(5) **Relative to corporations.**—Every corporation authorized to engage in agriculture must be restricted by its charter to the ownership and control of not more than 1,024 hectares of land. (Sec. 75, act of July 1, 1902, 32 U. S. Stats., 691.)

A corporation organized in any State of the United States or its Territories or insular possessions—that is, any corporation organized outside of the Philippine Islands—is a foreign corporation here, and must comply with the Philippine laws governing the transaction of business in these Islands by foreign corporations.

(6) **Location of public lands.**—The Spanish Government made no regular survey of the public domain, and the present Government has not yet authorized such a survey, so that neither the extent nor the location of the public lands is definitely known, and no maps showing the location of the lands subject to lease can now be furnished. The only information as to the public or private ownership of a given tract may be obtained from the residents of the community in which the land is located, by consulting the records of the old "Registro de propiedad" and the present register of deeds to see if the particular tracts about which information is sought have ever been registered. The land-tax assessment books of the provincial treasurer may show whether any taxes have been assessed against the land; and, if so, who claims it. The provincial treasurers will give the prospective lessees as much assistance as possible in locating the public lands.

No lease will be permitted to interfere with any prior claim by settlement or occupation until the consent of the occupant or settler is first had and obtained, or until such claims shall be legally extinguished.

(7) **Form of tracts.**—Leased lands, in all cases where possible, must be taken in tracts compact in form as provided in section 23 of the Public Land Act. Tracts to be contiguous must have one boundary in common. The purpose of this provision is to prevent the taking of land in long and irregular strips whereby adjoining public lands would be decreased in value. Leases may not be made of land lying in such a manner as to give the lessee control of any adjacent land, water, streams, shore line, way, roadstead, or other valuable rights, to the prejudice of the interests of the public.

(8) **The Public Land Act extended.**—The application of the provisions of Chapter III of the Public Land Act, in regard to leasing public lands, has been extended by resolution of the Philippine Commission, passed December 22, 1905, to the entire Province of Palawan, formerly known as the Province of Paragua, and to the following portions of districts of the Moro Province: In that portion of the district of Lanao not included in the basin of Lake Lanao; in the entire district of Davao, with the exception of the territory embraced within a circle having a radius of five miles and whose center is the central point in the district jail at Davao; in the entire district of Cotabato, with the exception of Catabato Island on which the town of Cotabato is located, the Island of Tamontaka, the area included within a circle whose radius is three miles and whose center is the central point in the masonry fort at Reina Regente, and the area within a circle whose radius is three miles and whose center is the central point in the masonry fort at Pikit; in the entire district of Zamboanga; and in the Island of Tawi-Tawi in the district of Sulu.[a]

(9) **Procedure in obtaining leases.**—Applications to lease public lands should be made on the blank forms printed and furnished by this Bureau for that purpose. A duplicate copy need not be filed. These forms may be obtained on application to the provincial treasurers, who have been designated to act as local land officers. The applicant will fill out the blank form of application, giving as accurate a description of the land as is possible, and send or take same to the provincial treasurer who will send it to this Bureau. The application will not be regularly filed until the notice required by law has been given. This notice will be prepared by the Bureau of Lands, the form of which will be found at the end of this circular. When this notice is sent to the applicant, he will then cause same to be published in two newspapers in both the English and Spanish languages, one of such newspapers being published in Manila and the other near the land, once in each week for the period of six successive weeks. He will also keep a copy of said notice, in both languages above mentioned, posted during the entire period of publication in the newspapers, in the following places: At the front door of the municipal building of the municipality in which the land is located; in a conspicuous place on the land sought to be leased; and on the bulletin board, if any, in the barrio in which the land is

[a] See pages 474–476.

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located. The Director of Lands will cause a copy of said notice to be posted upon the bulletin board at the office of the Bureau of Lands in Manila. Proof of publication in the newspapers for the required period shall be by affidavit of the managers of said newspapers. Proof of posting shall be by the affidavit of any person familiar with the facts.

If application be made by an individual it must be made under oath and give the citizenship of the applicant, post-office address, location of the land, that it is nonmineral in character, more valuable for agricultural than forestry purposes, and does not contain deposits of coal or salts. Great care should be taken to properly fill out all blank spaces in the application.

If the application be made by a corporation, a certified copy of its charter or articles of incorporation must be filed.

If the application be made by an unincorporated association, it must show that each member is qualified to lease public land under this chapter.

It is not necessary to have the land suryeyed in order to describe it in the application, nor is it necessary to employ a draftsman to make the sketch map called for by the application blank. The description and sketch map are only advisory to the land officials, but must be as full and complete as possible. The land should be described in such a manner that a person never having seen it could easily locate the same. A stake should be firmly set in the ground at each corner of the tract which it is desired to lease, and the approximate distance between stakes stated; the names of the adjoining landowners should be given; and if the land is near a road, stream of water, or any natural object, the name of, and distance to, such road, stream of water, or natural object should be stated.

At the end of the application the sketch map should show the points of the compass; the boundaries and names of adjoining landowners; the length of each portion of the boundary as nearly as practicable, in meters; all roads, streams of water, and any other natural objects, with their names.

(10) **Survey.**—The applicant must pay the actual cost of the survey to the Government, plus 10 per cent for the wear and tear of the instruments. The survey must be made by some one authorized by this Bureau. There is no objection, if the applicant desires, to have the land surveyed and a plat made by an expert before the notice is posted and published in the newspapers.

(11) **Adverse occupants.**—If application is made to lease agricultural public land, and such land is actually occupied by another person who is qualified to make a homestead or other entry thereof, or by any native who is entitled by law to a free patent, such person shall be personally served with a notice as to his rights and be allowed a preference right for one hundred and twenty days, from the time of service of such notice, in which to make entry or apply for patent. If such person does not avail himself of his rights, he must voluntarily vacate the land or he will be legally ejected.

(12) **Period of lease.**—Leases shall run for a period of not more than twenty-five years, but may be renewed for a second period of twenty-five years.

(13) **Rent.**—Lessees will be required to pay an annual rent in advance, the amount of which will be fixed by the Director of Lands, with the approval of the Secretary of the Interior, but it can not in any case be less than 50 centavos, Philippine currency, per hectare, and during the second period of lease can not exceed one and one-half pesos per hectare. It is probable that the rate of rental during the first period of twenty-five years will not exceed one and one-half pesos in ordinary cases, but where the land is extremely valuable it may exceed one and one-half pesos per hectare. The first payment of rent is due on the date of the execution of the lease and must be paid before the lease is delivered.

(14) **When lease will be executed.**—As soon as the application has been regularly filed, the Forestry Bureau will be requested to furnish a certificate as to whether or not the land is more valuable for agricultural than for forestry purposes. If this certificate, when received, states that the land is more valuable for agricultural than for forestry purposes, the Director of Lands will, with the approval of the Government, lease the land. He will then advise the applicant of the rate fixed; also of the probable cost of surveying the tract, if same has not been previously surveyed under the direction of this Bureau. Upon completion of the survey, in case there are no adverse claims to the land, a lease will be executed therefor as early as practicable.

(15) **Timber and mineral lands.**—A lessee of agricultural public land has no right to remove timber therefrom, except as authorized by the forestry regulations. No minerals may be removed from agricultural public lands under the

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lease. In case it is made to appear that such leased lands contain valuable mineral deposits, the Director of Lands, with the approval of the Secretary of the Interior, is authorized to cancel the lease as to such land.

(16) Revenue stamps and cedulas.—Act No. 1189 requires that a 20-centavo documentary stamp be affixed to each certificate issued by an officer authorized to administer oaths. These stamps should be attached at the places indicated on the application. The same act also requires persons to present their cedulas when taking an oath before any officer authorized to administer oaths.

(17) Penalty for false oath.—Section 27 of the Public Land Act provides that any person who shall willfully and knowingly make false proof or a false affidavit in support of his application or claim respecting the lands in the Philippine Islands shall be deemed guilty of perjury and punished accordingly.

C. H. SLEEPER, *Director of Lands.*

Approved:

DEAN C. WORCESTER, *Secretary of the Interior.*

FORM.

Notice of Application to Lease Public Lands.

The undersigned hereby gives notice that he will on the _____ day of _____, 19___, file with the Director of Lands, Manila, P. I., an application for a lease to the following described public land, beginning_____

_____

(Here give description as definitely as possible.)

_____

_____

located in the barrio of _____, municipality of _____, Province of _____ and containing _____hectares, more or less.

Signature of applicant _____

Post-office address _____

All persons claiming any right, title, or interest in or to the above-described land must present such claim to the Director of Lands at Manila before 12 o'clock noon, _____, 19____

_____

Director of Lands.

Dated _____, 19____

Laws.

ACT OF CONGRESS OF JULY 1, 1902.

Section 12 (see page 451)
Section 17 and 18 (see page 452)
Section 75 (see page 461)

ACTS OF THE PHILIPPINE COMMISSION.

[Act No. 926.]

CHAPTER III.—LEASES OF PORTIONS OF THE PUBLIC DOMAIN.

Sections 22 and 31 inclusive (see pages 465–467)

On July 26, 1904, the Civil Governor issued his proclamation declaring the Public Land Act to be in full force and effect from said date, as contemplated by section 13, act of Congress of July 1, 1902, above stated.

[No. 1404.]

AN ACT Providing that provincial treasurers shall perform the duties of local land officers.

(See page 517)

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BUREAU OF LANDS.

FREE PATENT CIRCULAR

Containing

Chapter IV of the public land act, providing for the issuance of free patents to native settlers, and instructions and forms pertaining thereto, issued June 11, 1906.

The following instructions, under Chapter IV of the Public Land Act (Act No. 926, as amended by Acts Nos. 979 and 1573), providing for the issuance of free patents to native settlers, are promulgated under section 69 of said act for the information of those concerned. As a supplement thereto will be found a copy of Chapter IV of said act and a copy of Act No. 1404, providing that provincial treasurers shall act as local land officers, and a copy of form to be used in applying for such free patents.

It is not the purpose of this law to allow titles acquired from private sources to be perfected thereunder, but solely to protect native occupants in their rights to land occupied by them as provided in said act.

The following requisites must exist or be complied with before a patent can be obtained under this particular chapter:

(1) The land must be unreserved, unappropriated agricultural public land. Urban property and land which can not be cultivated do not fall within this classification.

(2) The applicant must be a native of the Philippine Islands.

(3) The land must have been continuously occupied and cultivated by the applicant, or his ancestors, since August 1, 1898, or it must have been so occupied and cultivated continuously for three years immediately prior to August 1, 1898, and, in addition thereto, so continuously occupied and cultivated from July 4, 1902, until the date of the taking effect of the Public Land Act, July 26, 1904.

(4) The tract must not exceed 16 hectares in area, and but one tract may be secured by the applicant under this chapter.

(5) Persons desiring to avail themselves of the benefits of this chapter must do so prior to January 1, 1907.[a]

(6) An application must be filed with the local land officer, or, if there be no such officer, then with the Director of Lands, in Manila. This application must be executed under oath and must show the following facts:

(*a*) The name, age, and post-office address of the applicant.

(*b*) That he is a native of the Philippine Islands.

(*c*) The location of the land desired, stating the province, municipality, and barrio in which the same is situated, and as accurate a description as may be given, showing the boundaries of the land, having reference to natural objects and permanent monuments, if there be any.

(*d*) That the land is not claimed or occupied by any other person.

(*e*) It must give the date when the applicant or his ancestor entered into occupation and began the cultivation of the land, and what improvements have been made.

---

[a] Act No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909.
See page 478.

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(*f*) If the applicant claims through the entry, occupation, and cultivation by his ancestor, the application must show the name of such ancestor and his relationship to the applicant, and the applicant must file satisfactory evidence of the date and place of the death and burial of such ancestor. The patent will then be issued in the name of such heirs.

(7) The applicant must sign the application and appear before a notary public, or other officer authorized to administer oaths, and make affidavit as to the truth of the statements contained in the application, and such officer must attach his certificate to the application. A 20-centavo internal revenue stamp must be affixed to this certificate.

The Director of Lands will cause a careful investigation to be made into the truth of the allegations in the application, and, if satisfied that the applicant comes within the provisions of said Chapter IV, will cause the land to be surveyed and an accurate plat made thereof, and have notice that such application has been made published in the municipality and barrio in which the land is located, in order that adverse claimants may have an opportunity to present their claims. If adverse claimants do not appear to oppose the issuance of patent within a reasonable time (to be fixed in the discretion of the Director of Lands), a patent for such lands will be issued to the applicant.

No patents will be issued until the aforesaid survey and plat have been made and notice of application published. The expense thereof will be borne by the Insular Government.

The land covered by the patent secured as aforesaid shall be inalienable for a period of seven years, and shall not be subject to incumbrances for a like period. It shall not be liable for the satisfaction of any debt contracted prior to the expiration of such period.

C. H. SLEEPER, *Director of Lands.*

Approved November 22, 1905:
DEAN C. WORCESTER, *Secretary of the Interior.*

Chapter IV of the Public Land Act.

CHAPTER IV.

FREE PATENTS TO NATIVE SETTLERS.

Sections 32 to 35 inclusive (see pages 467–468)

NOTE.—Attention is called to the fact that by resolutions of the Philippine Commission, passed December 22 and 23, 1905, August 2, and December 29, 1906, the application of the provisions of said Chapter IV was extended to all provinces and districts in the Philippine Islands heretofore excepted.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS.

DEPARTMENT OF THE INTERIOR.

BUREAU OF LANDS.

FORM No. 14.

Application for Free Patent.

BUREAU OF LANDS No._____ LOCAL LAND OFFICE No._____

1. I hereby make application for a free patent to the following-described tract of land, under the provisions of Chapter IV of the Public Land Act, No. 926, viz (give as accurate a description as possible, showing boundaries of land, having reference to natural objects and permanent monuments, if any):_____

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situate in the barrio of_____, municipality of_____, Island of_____, Province of_____, Philippine Islands, and containing an area of_____hectares, _____ares, and _____centares.

2. I submit the following statement of facts to show that I am entitled to make this application:

3. My name is_____; I am_____ years of age; my post-office address is_____; and I am a native of the Philippine Islands.

4. The land described and applied for is not claimed or occupied by any other person, but is public land. I entered upon and began the cultivation of the same on the_____day of_____, 19____, with the intent to there establish a home for myself and family, and since that date I have continuously resided upon and cultivated the land, and have made theron the following improvements, viz:_____

_____

(NOTE.—If applicant claims through ancestor, paragraphs 5, 6, and 7 must be filled out.)

5. The land described and applied for is not claimed or occupied by any other person, but is public land. It was first entered upon and cultivated and occupied as a home on or about the_____day of_____, 19__, by_____, who was my_____. My said ancestor died on the_____day of_____, 19____, at_____, Province of_____, and was buried at_____, Province of_____, on the _____day of_____, 19____. Evidence of relationship, death, burial, and heirship is hereto attached and consists of____

_____

(NOTE.—Heirship must be judicially determined in regular administration proceedings, and a certified copy of the decree affixed hereto.)

The following are the names and addresses of the heirs of my said ancestor:

NAME.	POST-OFFICE ADDRESS.
_____	_____
_____	_____
_____	_____
_____	_____

6. Since the death of my said ancestor I have resided upon and cultivated said land, and the improvements now on the land consist of the following, viz: _____

_____

7. The land has been continuously occupied and cultivated by me, or by my said ancestor, since the date of entry thereon, as above stated, except during the following-named periods, when the land was not occupied, for the reason stated, viz: _____

_____

8. The land applied for is now occupied and cultivated by me, and to the best of my knowledge, information, and belief it is otherwise unreserved and unappropriated, and is nonmineral, agricultural public land, contains no valuable deposits of coal or salts, and is more valuable for agricultural than forestry or other purposes.

9. The following named witnesses will testify that the allegations of this application are true:

NAME.	POST-OFFICE ADDRESS.
_____	_____
_____	_____
_____	_____
_____	_____

_____
(Applicant.)

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AFFIDAVIT.

PHILIPPINE ISLANDS, PROVINCE OF _____ } ss.
MUNICIPALITY OF _____

10. I, _____, the person making the foregoing application, first being duly sworn, upon my oath depose and say: That I have read, or have had read to me, and thoroughly understand the foregoing application; that I signed the same and this affidavit in the presence of the officer who administered the oath; that each and every statement in said application is true and correct. So help me God.

_____

11. Before me, at the place aforesaid, on this _____ day of _____, 19 , personally appeared _____, to me personally known to be the person whose name appears in the foregoing application and in my presence signed the said application and subscribed and swore to this affidavit.

12. The affiant exhibited to me his cedula, No. _____, issued at _____ _____ on the _____ day of _____, 19___, which showed him at the date of said cedula to be _____ years of age and a native of_____

{Here attach a 20-centavo internal-revenue stamp.}

_____
(Officer authorized to administer oaths.)

_____
(Official title.)

(NOTE.—Any person who perverts the truth in the narration of facts contained in the foregoing application is guilty of the crime of *falsification of a public document* and is punishable with the penalties of *presidio mayor*, viz, imprisonment for six years and one day to twelve years, and a fine of from 1,250 pesetas to 12,500 pesetas. (Art. 301, Penal Code.)

(The officer administering the oath will call the attention of the applicant to the foregoing.)

SPACE FOR SKETCH MAP.

(The services of a surveyor or expert draftsman are not required.)

[No. 1404.]

AN ACT Providing that Provincial Treasurers shall perform the duties of local land officers.

(See page 517.)

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BUREAU OF LANDS.

PRIMER

Containing

Questions and answers on the public land laws in force in the P. I. issued February 26, 1906.

Public Lands.

(1) QUESTION. What is the difference between *public* land and *private* land?

ANSWER. Public land is land the title to which is in the Government and which is administered by the Government for the benefit of the whole people. No one can get this land for himself except in the way ordered by the Government. Public land is also called Government land because the Government controls it. Public land does not belong to the officials or officers of the Government. It belongs to the Government, which holds it for the benefit of all the people. Land which is owned by private persons is called private land. When any person buys public land from the Government, or gets title to public land in the way ordered by the Government, it becomes private land.

(2) Q. Which lands can not be taken up under the Public Land Act?

A. Private lands; lands which have been reserved for the use of Government farms, military reservations, forest reserves, schools, parks, etc.; and the lands recently purchased by the Philippine Government, commonly known as Friar Lands.

(3) Q. Is there very much public land in the Philippines?

A. It was estimated several years ago that there are 8,400,000 hectares of agricultural lands and twice that amount of forest lands on the public domain. Some of the forest lands will become agricultural lands when the timber is cut off.

(4) Q. Where is this public land?

A. It is in many provinces. Nearly all of the mountains and most of the land that is unplanted and far away from the towns is public land. In Luzon these provinces have much public land: Cagayan, Isabela, and Nueva Vizcaya. All the provinces have some public land. Much of this land is good land. (See Question 61.)

(5) Q. Why is there so little private land?

A. Because the Filipinos have not tried hard to get land of their own. They have worked on the lands of other people. They have not often enough sought and planted new land for themselves.

(6) Q. Why did not the Filipinos try to get land for themselves?

A. They did not know where the public land was. They did not know how to get it. Also they did not like to move away from their homes to distant places. If a man wishes to have land and a home of his own, he must be willing to leave for a while his town and his amusements and friends. This is the way the early settlers of America and many other countries did.

(7) Q. How can a Filipino get public land so that it may be his?

A. In three ways—by making a homestead on public land; by gift from the Government; by buying it from the Government. A person may lease land from the Government, which gives him the right to live on it, to use and to cultivate it. If a person leases land from the Government, he does not own it.

(8) Q. What are the different amounts of land that a man may get from the Government by the various land laws?

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A. If the lands are taken in order named below a man may own or control the following amounts of public land:

(1) Sixteen hectares as a homestead.
(2) Sixteen hectares by purchase.
(3) One thousand and twenty-four hectares by lease.

(9) Q. Is it necessary to put revenue stamps on the application for public lands?

A. Yes. Each time a notary public administers an oath he must see that a twenty centavo internal revenue stamp is attached to such oath, and also must see the cedula of the person to whom he administers oath, if such person is required by law to have a cedula.

Free patents to public lands.

(See Chapter IV, Public Land Act.)

(10) Q. What kind of public land may be obtained under a free patent?

A. Unreserved, unappropriated, nonmineral agricultural public land.

(11) Q. What is a "free patent" to public land?

A. It is a document giving absolute title to a tract of public land without charge.

(12) Q. Who may obtain free patents to public lands?

A. Only natives of the Philippines.

(13) Q. How is the right to a free patent obtained?

A. A free patent is given to any native of the Philippine Islands who has lived on public land without a title a certain number of years before January 1, 1907.[a]

(14) Q. How long must a Filipino have lived on and cultivated public land to obtain a free patent?

A. From August 1, 1898, to the present time. If his ancestors have occupied and cultivated the land during part of this time and he the rest of the time, he is entitled to a free patent. Also, if he and his ancestors continuously occupied and cultivated the land from August 1, 1895, to August 1, 1898, and from July 4, 1902, to July 26, 1904, he may claim a free patent, even if he and his ancestors did not live on the land between August 1, 1898, and July 4, 1902.

(15) Q. How large a tract of land may be obtained under a free patent?

A. Not more than sixteen hectares, or about forty acres.

(16) Q. Will a free patent be given for more than one piece of land if the total area is not more than sixteen hectares?

A. No. One individual can obtain a free patent to only one tract of land.

(17) Q. How can a title be obtained to an additional tract or tracts?

A. By making application to the Court of Land Registration under Chapter VI of the Public Land Act, No. 926.

(18) Q. Before what time must the application be made?

A. The application for a free patent must be made before January 1, 1907.[a] After such date no application can be considered.

(19) Q. To whom must the application for free patent be sent?

A. To the provincial treasurer, who is local land officer in each province.

(20) Q. What must be written in the application for a free patent?

A. The application for a free patent must contain the following information:

(*a*) The name, age, and post-office address of the applicant.
(*b*) It must state that the applicant is a native of the Philippine Islands.
(*c*) The location of the land (naming province, municipality, and barrio).
(*d*) A description of the land, showing the boundaries, etc.
(*e*) A statement that the land is not occupied by any other person.
(*f*) A statement that the land has been occupied by the applicant or his ancestors for the prescribed time (see Question 14), and a description of the improvements, if any, that they have made on the land.
(*g*) If the claim is based on the holding of land by an anecstor, the name of the ancestor and satisfactory evidence of the date and place of his death and burial must be given.

(21) Q. What notice must be given before a patent will be issued?

A. A written notice of the application must be posted in the municipality and barrio where the land is situated in order to give any person who has a claim to the land an opportunity to present the same.

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[a] Act No. 1573 of the Philippine Commission, enacted December 12, 1906, extends from January 1, 1907, to January 1, 1909, the time within which native settlers may file applications for free patents. Wherever the date January 1, 1907, appears herein, same should now read January 1, 1909. (See page 478.)

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(22) Q. When must a survey and plat of the land be made?
A. Some time before the free patent is given.
(23) Q. Who pays the cost of making the survey and the plat?
A. The Government of the Philippine Islands.
(24) Q. May I sell, or borrow money on, the land acquired by a free patent?
A. After seven years from the time the free patent is given, you may borrow money on the land, or you may sell it, but not before the end of seven years.
(25) Q. May the land be sold for debt?
A. Not if the debt was made before the end of the seven years from the time the patent was given.

Homesteads.

(See Chapter I, Public Land Act.)

(26) Q. What public land is subject to a homestead entry?
A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural public land.
(27) Q. What is a homestead?
A. A homestead is the permanent home of a man and his family. The land that the Government gives him and the house that is built on it make the homestead.
(28) Q. Will the Government give a man a house and land?
A. No. It will give him the land, but he must build his own house. The land that the Government gives him is called a homestead.
(29) Q. How much land will the Government give a man for a homestead?
A. The Government will give sixteen hectares, or about forty acres, of public land to Filipinos who will live upon it and cultivate it for five years.
(30) Q. Why does the Government give homesteads to people?
A. Because it is better for the people to have land and homes of their own than to work for other people and live on the lands of others. People who have their own homes are better citizens and more prosperous than those who do not.
(31) Q. To whom will the Government give a homestead?
A. To any citizen of the Philippines, or of the United States, or of any insular possession of the United States, who is more than twenty-one years of age. If a man or woman is the head of a family, he or she may get a homestead even if less than twenty-one years of age.
(32) Q. May a married woman get a homestead?
A. Yes; if her husband will never be able to get food for his family, on account of sickness or insanity.
(33) Q. May the husband and the wife each have a homestead?
A. No; a husband and wife can have only one homestead.
(34) Q. May the son of a family get a homestead?
A. Yes; if he is over twenty-one years of age, or if he is the head of a family, even if not twenty-one years of age.
(35) Q. May a man who already owns land get a homestead?
A. No man who already owns more than sixteen hectares of land may get a homestead from the Government.
(36) Q. May a man get more than one homestead?
A. No.
(37) Q. What is the first thing I must do when I wish to get a homestead?
A. You must first find the Government land which you wish to own as your homestead.
(38) Q. How may I know that the land I want is surely public land?
A. Ask the provincial treasurer. It is his duty to tell you if he knows. Land that no one pays a tax on is probably public land. Tell the treasurer exactly where the land is, and he will tell you whether it is public land or not, as far as his records show.
(39) Q. What must I do next?
A. Ask the provincial treasurer for the blank paper called "Homestead Application, B. L. Form No. 7." This paper has questions on it that you must answer in writing. If you wish, you may write to the Director of Lands, Manila, and ask him to send you a copy of this paper.
(40) Q. What must I tell in this paper?

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A. You must tell these things:

(a) Your name and post-office address.

(b) You must say in what province, municipality, and barrio the land is.

(c) You must say that the land contains no coal, salt, or valuable mineral, like gold or silver. You must also say that the land is more useful for farming than for cutting timber.

(d) You must say that no one lives on the land.

(e) You must say that you want this land for yourself; that you will live on it and cultivate it. You must also say that you are not getting this land for any other person.

(f) You must describe the land.

(41) Q. What do you mean by "describe"?

A. You must tell exactly where the land is and what its shape is. If the land is near a road or river you must say so. You must say who owns the land all around it. You should drive a stake into the ground at each of the four corners of your land and measure the distance between the stakes. You should pick out a piece of land that is rectangular in form, and not more than eight hundred meters long. If you choose a square piece of land containing sixteen hectares, each side of the square will be four hundred meters long.

(42) Q. When I have answered all the questions in the paper, what must I do next?

A. You must go before a notary public, or other officer authorized to administer oaths, and swear that all you have said in the paper is true.

(43) Q. Where shall I send this paper?

A. You must send the paper to the provincial treasurer.

(44) Q. What must I pay when I send in this application?

A. You must pay ten pesos at the time you send in the application, and you must also pay twenty centavos for a revenue stamp to be attached to your oath.

(45) Q. Is this all I will have to pay to get a homestead?

A. No; at the end of five years you must pay ten pesos more.

(46) Q. What must I do to gain a homestead?

A. You must live five years on the land. You must cultivate and improve the land.

(47) Q. May I go away from my homestead for a short time?

A. Yes; you may personally go away from your homestead for not more than six months at one time, but you must maintain your legal residence thereon.

(48) Q. Must I obtain permission to temporarily cease to reside on my homestead?

A. Yes; you must secure such permission from the Director of Lands at Manila.

(49) Q. What reason must I give for asking permission to temporarily cease to reside on my homestead?

A. Permission will be given for reasons as follows: War or an insurrection, total or partial failure of crops, sickness, or to earn money with which to make improvements on the land.

(50) Q. May I own a house in town, or elsewhere, and go there to spend Sundays and holidays?

A. Yes.

(51) Q. If I am absent from the homestead for more than six months at one time what will happen?

A. You will lose all claim to the land if you are absent from it more than six months at one time.

(52) Q. Suppose I die before I gain full right to the land?

A. If you have a wife she will have a chance to complete the five years of residence and so gain the homestead. If you die unmarried the claim to the land will go to those persons who would have had your land if you had died fully owning it.

(53) Q. What must I do five years after date of filing application for a homestead?

A. You must furnish the Bureau of Lands with "final proof" as to your homestead.

(54) What is meant by "final proof"?

A. At the end of five years you must show the authorities that you have lived five years on the land and have cultivated and improved the land. Two men

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who have no interest in the land must swear that you have really done this. To do this is to make "final proof." You may make this final proof at any time within three years after you have lived there five years.

(55) Q. What is the last thing I must do to get a homestead?

A. When you have made final proof you must pay ten pesos. You will have then paid twenty pesos in all for your land. After that there is no more to pay. The Government will then give you a paper called a "patent" or "title." This paper says that you own the land. No one can take that land from you. The Government, before giving you the patent, will survey, or measure carefully, the land. The Government will pay the expense of this survey.

(56) Q. Suppose I owe some money; can the man whom I owe take my homestead?

A. No; your homestead can not be taken from you to pay any debt that was made before the patent was given to you.

Sales of public lands.

(See Chapter II, Public Land Act.)

(57) Q. What public land is subject to sale?

A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural public land.

(58) Q. Who may buy public lands of the Government?

A. Anyone who is a citizen of the Philippine Islands, or of the United States, or of any of the insular possessions of the United States. Several citizens may make a company or corporation to buy land.

(59) Q. Who are citizens of the Philippine Islands?

A. All inhabitants of the Philippines who were residing in the Philippines April 11, 1899, and were at that time subjects of Spain, if they have not made a declaration before a court of record that they wish to remain Spanish subjects. The children and descendants of these citizens, if born since April 11, 1899, are also citizens of the Philippine Islands.

(60) Q. How much land may a citizen, a company of citizens, or a corporation purchase?

A. One citizen may purchase sixteen hectares, or about forty acres. A company of citizens may purchase sixteen hectares for each member if the company is not incorporated. A corporation—that is, a company organized by law—may purchase not more than one thousand and twenty-four hectares.

(61) Q. Where are the public lands that may be bought?

A. The public lands have not been surveyed under either Spanish or American rule. Therefore, it is not known exactly where they are. You may find out by asking the old residents of a town. You may also learn something from the old "Registro de Propiedad" and the "Register of Deeds" now kept. Here you may find whether the land has ever been registered. The provincial treasurer will tell you if the land has ever been taxed. If not, it is probably public land.

(62) Q. May I purchase land on which trees are growing.

A. You may if the land is more valuable for agriculture than for forestry.

(63) Q. What should be the shape of the public land that I purchase?

A. It should be in one piece, as nearly as possible rectangular in shape, and not more than eight hundred meters long.

(64) Q. May I gain a homestead and also buy sixteen hectares of public land?

A. Yes; if you do what the Government requires in the case of both pieces of land. You must occupy and cultivate the land which you buy; you need not live on it yourself. You may have another man live on it and cultivate it for you. But in the case of a homestead, you, yourself, must live on the land.

(65) Q. How shall I make application to purchase public land?

A. You must fill out the answers to the questions on a blank form.

(66) Q. Where can I get this form?

A. You may get this form of the provincial treasurer or of the Director of Lands at Manila.

(67) Q. What must I write in the form?

A. You must tell whether you are a citizen of the Philippine Islands, the United States, or of an insular possession of the United States. You must give the name of the barrio, municipality, and province in which you live. You must describe the land. (See Question 41.)

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If a company wants to buy the land it must show in the form that each member of the company has the right to buy land of the Government.

If the company is incorporated, it must send with the form a copy of the paper which contains the rules under which the company was incorporated.

(68) Q. What is done in reply to the request to buy land?

A. If the land, after examination, is found to be more valuable for agriculture than for cutting trees for timber, a fair price is set upon it. It is then advertised in the newspaper as for sale. Those who wish to buy it must make an offer stating the price they are willing to give. The offer must be inclosed in a sealed envelope and sent to the address given in the newspaper. Then, at a time and place mentioned in the advertisement, the envelopes will be opened. The land will be sold to the one who has made the highest offer.

(69) Q. What is done if the two highest bids are equal?

A. If one of such highest bidders is the original applicant, the land will be given to him. If, however, the original applicant is not of such highest bidders, then the land will be at once put up for oral bidding and given to the highest qualified bidder upon his depositing twenty-five per cent of the amount of his bid and making proper application for the land.

(70) Q. Suppose one who buys land of the Government does not obey the rule to occupy and cultivate the land?

A. Then the land goes back to the Government.

(71) Q. Does he get his money back?

A. No; he loses all he has paid.

(72) Q. How are the payments made for public lands?

A. When you make the offer, you must send in the envelope a certified check or postal money order equal to one-fourth of the amount you offer for the land. The check or order must be payable to the Director of Lands, or order. The remaining three-fourths of the sum you offer may be paid in either of the following three ways:

(*a*) All at once when you receive notice that you may buy the land.

(*b*) In five equal parts, one a year.

(*c*) All at the end of five years from the time the land is sold to you.

If your offer for the land is too low, the Government will at once return your money to you.

(73) Q. What interest must I pay on the money which remains unpaid after I have bought the land?

A. You must pay six per cent interest every year on all money which remains unpaid after your offer is accepted.

(74) Q. Suppose the public land I wish is already occupied by some one.

A. If the person living on the land is a person who has a right to gain a homestead or free patent, he must be told his rights and given one hundred and twenty days to ask for the land. He has the first claim during that one hundred and twenty days.

If he does not ask the Government for the land he must leave the land. If he does not leave it you may ask the Director of Lands to compel him to leave it.

(75) Q. When is the land surveyed and who pays for the survey?

A. The survey must be made some time before the patent is given. If one person is buying the land for himself, the Insular Government will pay the cost. If the purchaser is a company or corporation it must pay for the survey.

(76) Q. How long must one occupy and cultivate the land in order to get a patent?

A. Five years. You must prove this just as in the case of a homestead. You must also state that you have not sold the land nor done anything to encumber the title to it.

(77) Q. May I borrow money and give the land as security?

A. No; that would be encumbering the title.

(78) Q. What will it cost per hectare to buy public land?

A. It is not possible to say, as the price will be fixed according to the location and quality of the land. The law says that the price shall not be less than ten pesos per hectare. As the Government wants the people to buy the land, a fair or low price will be put on it.

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Leases of public land.

(See Chapter III, Public Land Act.)

(79) Q. What public land is subject to lease?

A. Any unoccupied, unreserved, unappropriated, nonmineral agricultural land.

(80) Q. What is a lease of public land?

A. It is a contract or promise on the part of the Philippine Government to allow a person to hold and use a portion of the public land for a certain time at a certain price.

(81) Q. Who may obtain leases of public land?

A. Any citizen of the Philippine Islands, or of the United States, or of its insular possessions, and a corporation, or any company of persons formed under the laws of these countries and authorized to do business in the Philippine Islands.

(82) Q. How much land may be leased by one person, corporation, or company?

A. Not more than one thousand and twenty-four hectares—that is, about two thousand five hundred and thirty acres.

(83) Q. May one lease public land without the need of living on it?

A. Yes; if he employs another man to cultivate the land and live on it.

(84) Q. What must a corporation or company be careful of?

A. It must use the land it leases only for the purpose for which the corporation or company was lawfully created, and which it may lawfully pursue in the Philippine Islands.

(85) Q. What must be the shape of the land that is leased?

A. It must be in the form of squares, if possible, if it is more than sixty-four hectares in size. An additional tract of thirty-two hectares may be leased if the long side of this rectangular tract lies along one of the sides of the tract of sixty-four or more hectares.

(86) Q. In what places may land not be leased?

A. Land may not be leased that is so situated that the holding of it will damage any public interest. For example, if there is a stream at which all the people of a town get their water and do their washing the land on both sides of it may not be leased in such a way as to prevent the people from using the water of the stream. Land may not be leased if it is needed for a public roadway. If a town has a small harbor, and the land on the shore is public land, that land can not be leased if that would prevent the people from using the shore for their boats. If, in any way, the leasing of public land would injure the rights of the public—that is, all the people of a district—that land may not be leased.

(87) Q. To whom must an application for the lease of public land be sent?

A. To the provincial treasurer.

(88) Q. What must be written in the application?

A. You must write your name, your post-office address, and tell of what country you are a citizen. You must tell where the land you wish to lease is, and describe it fully. You must say that it does not contain coal or salt or any valuable minerals, and that it is more valuable for agricultural purposes than for cutting timber. If a corporation applies to lease land, it must show in the application that it is properly formed by law, and that it has a right to do business in the Philippine Islands.

(89) Q. What notice must be given if a person intends to lease agricultural public lands?

A. He must post notices in the English and Spanish languages.

(90) Q. Where must these notices be posted?

A. They must be posted in four places:

(*a*) In a place on the land where it can be easily seen.

(*b*) At the front door of the municipal building of the municipality in which the land is located.

(*c*) On the bulletin board of the barrio in which the land is located, if any.

(*d*) On the bulletin board at the office of the Bureau of Lands.

(91) Q. What other notice must be given?

A. The same notice as the one posted must be published in both the English and Spanish language for six successive weeks in one newspaper in Manila, and in one newspaper near the land applied for (if there be any).

(92) Q. When must this notice be posted and published?

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A. As soon as an application for leasing agricultural public lands is received in the Bureau of lands at Manila a notice will be made and sent to the applicant and he must then make arrangements for posting and publishing the notices.

(93) Q. Who must pay for posting and publishing the notices?

A. The person who intends to lease the land.

(94) Q. For how long a time may leases be made?

A. For not more than twenty-five years. At the end of twenty-five years the lease may be renewed for another twenty-five years.

(95) Q. What rental must be paid yearly during the first twenty-five years?

A. Not less than fifty centavos per hectare yearly.

(96) Q. What rate of rental must be paid during the second lease of twenty-five years?

A. Not more than ₱1.50 per hectare yearly during the second lease of twenty-five years.

(97) Q. When must the rent be paid?

A. Once a year, in advance.

(98) Q. If a man leases public land, may he re-let it to another man?

A. Not unless he first gets the consent of the Director of Lands and of the Secretary of the Interior.

(99) Q. When must the land that is leased be surveyed?

A. The survey must be made before the lease is given. The Director of Lands has charge of this survey. An accurate plat (map) of the land must be made.

(100) Q. Who pays for the survey?

A. The man who leases the land from the Government pays the expenses of the survey.

(101) Q. May the man who leases the land cut timber from it?

A. He may cut timber only in accordance with the general rules of the Bureau of Forestry.

(102) Q. May a man take away from the land he leases stone, oil, coal, salt, or other valuable mineral?

A. No; he must first have the part of this land that contains oil or minerals cut from his lease. He may occupy the land containing oil or minerals under a mining claim, if he desires and complies with the mining law.

Unperfected titles and Spanish grants and concessions.

(103) Q. To whom does this chapter apply?

A. To all persons in the Philippine Islands who own, or claim to own, property, but have no written title showing that the Government has transferred the title to private persons.

(104) Q. How can I know whether I am entitled to the benefit of said chapter?

A. No. By reading carefully paragraphs 1 to 6 of section 54 of Act No. 926, especially paragraph 6.

(105) Q. Why is it necessary that I should avail myself of this chapter, when I and my family have been in possession of the land for many years?

A. Because the Attorney-General of the Philippine Islands has held that no title can be acquired against the Government by prescription. Also because there is no other way of obtaining registered title to your property, as the old methods of *Informaciones Posesorias*, etc., were done away with by the Code of Civil Procedure.

(106) Q. Will all property owners in the Philippine Islands have to ask for registered title under the provisions of Chapter VI?

A. Not all, but about eighty or ninety per cent of them will.

(107) Q. Why is this necessary when it is considered that several hundred thousand persons secured title from the Government when the Spaniards were in power?

A. Because all the land records in the Islands, with the exception of three or four provinces, were destroyed and no record exists showing what lands were thus disposed of by the Government.

(108) Q. But suppose I have the original of the title granted by the Government, do I still have to make application under this Chapter?

A. No. Application can then be made to the Court of Land Registration under the provisions of Act No. 496 (Land Registration Act).

(109) Q. To whom do I make application for registration of titles under this chapter?

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A. To the Court of Land Registration, which has its main office in Manila but which holds sessions in all the provinces.

(110) Q. How much does it cost to secure title in the Court of Land Registration under this chapter?

A. If the land and improvement are assessed at ₱200 or less, the fee is only ₱20. If the value is more than ₱200 a deposit of ₱40 and ₱1 for every thousand pesos of the value of the property.

(111) Q. Will the ₱40 and ₱1 per thousand cover all fees in the court?

A. In nearly all cases, yes; but sometimes when there are many people to be notified and the descriptions are long the fees will be more.

(112) Q. Suppose I deposit more than enough money, or too little?

A. If, when the case is decreed by the court, the fees do not amount to as much as you deposited, the Clerk of the Court will return you the difference. If the amount deposited is too small, the clerk will call upon you to remit more when the original amount is expended.

(113) Q. Are there any other fees which I must pay before I can secure my certificate of title?

A. When the value of the property is ₱200 or less, no; but when the value is more than ₱200 you must pay the register of deeds ₱6 and ₱1 per thousand of the assessed value.

(114) Q. What should I do in order to make application?

A. First you should write a letter to the Director of Lands asking that a surveyor be sent to survey your lands.

(115) Q. How much will it cost for survey?

A. Only the actual cost to the Government for the surveyor and his assistants and material, plus ten per cent to cover wear and tear of instruments.

(116) Q. Why should I request a surveyor from the Bureau of Lands?

A. Because before you can secure title from Court of Land Registration your land must be surveyed under direction of the Bureau of Lands, and if survey is not made by a surveyor of the Bureau, or some private surveyor working under direction of the Bureau, at least two or three months will pass after decree of court before you can get your certificate of title, because no certificate can issue until a survey has been made by the Bureau of Lands.

(117) Q. After I have a plan of my land what should I do?

A. Write to the register of deeds of your province, or to the clerk of the Court of Land Registration, and request application blanks.

(118) Q. Do I need any other information?

A. No; because there are full instructions on the back of each application.

(119) Q. What is the best way for me to prove to the Court of Land Registration that I am entitled to secure a registered title to my land?

A. First, you should clearly state in your application all the information required by section 57 of Act No. 926; second, at the time of the hearing of your application by the court you should be prepared to prove by witnesses the statements made in your application. Unless you clearly prove to the court that you have fulfilled the requirements of Chapter VI your application may be denied by the court.

(120) Q. To whom should application and accompanying papers be presented?

A. After the application has been properly filled out, according to instructions, it may be presented, with the necessary deposit, to the register of deeds of your province, or in case there is no register of deeds then to the treasurer of the province, who is acting register of deeds; or it may be forwarded, with deposit, to the clerk of the Court of Land Registration in Manila.

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ACTS PERTAINING TO EMINENT DOMAIN AND FORECLOSURE OF MORTGAGE.

EMINENT DOMAIN.

Code of civil procedure—Act No. 190.

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SEC. 241. (*As amended by Act No. 665.*) *How the right of Eminent Domain may be exercised.*—The Government of the Philippine Islands, or of any province or department thereof, or of any municipality, and any person, or public or private corporation having by law the right to condemn private property for public use, shall exercise that right in the manner hereinafter prescribed.

The words "public use" in this section shall include the use of land in these Islands for the construction and maintenance of military posts to be occupied by United States forces stationed in the Philippine Islands, and an action in the name of and on behalf of the Philippine Insular Government for the enforcement of the right of eminent domain for the public use thus described may be instituted under this section and the title acquired by the Philippine Government in this land shall be indefeasible and, in furtherance of the use herein described, may be by the Philippine Government, in accordance with a resolution of the Philippine Commission, transferred by a duly executed deed of the Civil Governor to the United States forever.[a]

SEC. 242. *The Complaint.*—The complaint in condemnation proceedings shall state with certainty the right of condemnation, and describe the property sought to be condemned, showing the interest of each defendant separately.

SEC. 243. *Appointment of Commissioners.*—If the defendant concede that the right of condemnation exists on the part of the plaintiff, or if, upon trial the Court finds that such right exists, the Court shall appoint three judicious and disinterested landowners of the province in which the land to be condemned, or some portion of the same, is situated, to be Commissioners to hear the parties, and view the premises, and assess damages to be paid for the condemnation, and to report their proceedings in full to the Court, and shall issue a commission under the seal of the Court to the Commissioners authorizing the performance of the duties herein prescribed.

SEC. 244. *Duty of Commissioners.*—Before entering upon the performance of their duties, the Commissioners shall take and subscribe an oath before the Judge, or Clerk, or any Justice of the Peace for the province, that they will faithfully perform their duties as Commissioners, which oath shall be filed in Court with the other proceedings in the case. Evidence under oath may be introduced by either party before the Commissioners, who are hereby authorized to administer oaths on hearings before them, and the Commissioners shall, unless the parties consent to the contrary, go to the premises together and view the property sought to be condemned, and its surroundings, and may examine and measure the same, after which either party may, by himself, or counsel, or both, argue the cause. The Commissioners shall assess the value of the property taken and used, and shall also assess the consequential damages to the property not taken and deduct from such consequential damages the consequential benefits to be derived by the owners from the public use of the land

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[a] Note: Act No. 665.

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SEC. 2. An action for the enforcement of the right of eminent domain on behalf of the Government of the United States may be instituted in the name of the Government of the United States upon the direction of the President of the United States or the Secretary of War, or upon the application of the Commanding General of the United States Army, Division of the Philippines.

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Enacted March 5, 1903.

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taken, or from the operation of its franchise by the corporation, or by the carrying on of the business of the corporation, or person taking the property: *provided*, the consequential benefits assessed shall in no case exceed the consequential damage assessed; *provided, further*, that nothing in this section shall be so construed as to deprive the owner of the actual value of his property so taken or used.

SEC. 245. *Report of Commissioners.*—The Commissioners shall make full and accurate report to the Court of all their proceedings under their commission; but none of their proceedings shall be effectual to bind the property or the parties until the Court shall have accepted their report and rendered judgment in accordance with its recommendations.

SEC. 246. *Action of Court upon Commissioners' report.*—Upon the filing of such report in Court, the Court shall, upon hearing, accept the same and render judgment in accordance therewith; or for cause shown, it may recommit the report to the Commissioners for further report of facts, or it may set aside the report and appoint new Commissioners; or it may accept the report in part and reject it in part, and may make such final order and judgment as shall secure to the plaintiff the property essential to the exercise of his rights under the law, and to the defendant just compensation for the land so taken, and the judgment shall require payment of the sum awarded as provided in the next section, before the plaintiff can enter upon the ground and appropriate it to the public use.

SEC. 247. *Rights of plaintiff after the judgment.*—Upon payment by the plaintiff to the defendant of compensation as fixed by the judgment, or after tender to him of the amount so fixed, and payment of the costs, the plaintiff shall have the right to enter in and upon the land so condemned, to appropriate the same to the public use defined in the judgment; in case the defendant and his attorney absent themselves from the Court, or decline to receive the same, payment may be made to the Clerk of the Court for him, and such officer shall be responsible on his bond therefor, and shall be compelled to receive it.

SEC. 248. *Effect of exceptions.*—The allowance of a bill of exceptions in condemnation proceedings shall not operate as a supercedeas, nor shall the right of the plaintiff to enter upon the land of the defendant and appropriate the same to public use be delayed by appeal to the Supreme Court. But if the Supreme Court shall determine that no right of appropriation on the part of the plaintiff existed, the case shall be remanded to the Court of First Instance with mandate that the defendant be replaced in possession of the property and that he recover the damages sustained by reason of the possession taken by the plaintiff.

SEC. 249. *Costs.*—The costs in all cases under this chapter relating to Eminent Domain shall be paid by the plaintiff; but in case the action is carried to the Supreme Court by the owner, the costs in the Supreme Court shall be paid by the owner if the judgment is affirmed.

SEC. 250. *Fees of Commissioners.*—The Commissioners appointed to condemn land for public uses in accordance with the preceding sections, shall receive a compensation of four pesos per day each for the time actually and necessarily employed in the performance of their duties and in making their report to the Court, which fees shall be taxed as a part of the costs of the proceedings and paid as provided in the preceding section.

SEC. 251. *Final judgment, its record and effect.*—The record of the final judgment in such action shall state definitely by metes and bounds and adequate description, the particular land or interest in land condemned to the public use, and the nature of the public use. A certified copy of the record of the judgment shall be recorded in the office of the registrar of deeds for the province in which the estate is situated, and its effect shall be to vest in the plaintiff for the public use stated the land and estate so described.

SEC. 252. *Power of guardian in condemnation proceedings.*—The guardian or guardian *ad litem* of a minor or person of unsound mind, may, on behalf of his ward, by approval of the Court do and perform any act, matter or thing respecting the condemnation for public uses of the land belonging to such minor or person of unsound mind, which such minor or person of unsound mind could do in such proceedings if he were of age or of sound mind.

SEC. 253. (*As amended by Act No. 665.*) *Persons not notified not affected by such proceedings.*—Nothing herein contained shall be construed so as to injure, prejudice, defeat or destroy the estate, right or title of any person claiming land or any part thereof, or any interest therein, who was not made a party defendant to the condemnation proceedings and did not have actual or constructive notice of the proceedings in such manner as the law requires. *Provided, never-*

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theless, That when it shall be made to appear to the court that the interest of each of the several defendants in the land, or any interest therein, can not be clearly ascertained in the proceedings, or when it shall appear that the names of the several owners are not all known and can not be ascertained, the court may order the payment of the amount of damages awarded into court in the manner provided in section two hundred and forty-seven, and direct that it shall there remain until the land and interests therein involved in the litigation shall be brought under the operation of "The Land Registration Act," and it shall thereupon be the duty of all parties claiming the land, or an interest therein, to perfect their claims in the Court of Land Registration. Upon the final perfecting of the title, and proof thereof in the court in which the condemnation proceedings are pending, that court shall adjudge and award the damages that have been allowed to the parties whose rights have been thus established, and shall further adjudge that no other parties are entitled to an interest in said land or the improvements thereon, and the rights of any other persons claiming the land, or any interest therein, shall be forever thereafter barred.

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Enacted Aug. 7, 1901.

[No. 294.]

AN ACT Authorizing the exercise of the right of eminent domain as to personal property and property that is partly personal and partly real, and providing the method of procedure for exercising that right.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. The government of the Philippine Islands and that of any province or department thereof, and of any municipality, shall have the right to condemn private personal property and property that is partly personal and partly real, for public use, and shall exercise that right substantially in the manner provided in sections 241 and 253 inclusive, of Act 190, entitled, "An Act Providing a Code of Procedure in Civil Actions and Special Proceedings in the Philippine Islands," which sections relate to the exercise of the right of eminent domain in relation to real estate.

SEC. 2. The Commissioners to be appointed in accordance with section 243 of said Code for condemnation of personal property and property that is partly personal and partly real shall be three judicious and disinterested residents of the province in which the property to be condemned, or some portion of the same, is situated; or if the same is situated in the city of Manila, then such residents of the city of Manila.

SEC. 3. The Commissioners shall be sworn faithfully to perform their duty, before any authority authorized to administer oaths; they shall receive evidence, examine the property sought to be condemned, hear the parties or their counsel, assess the value of the property taken and used, as is provided in Section 244 of said Code; but, in the case of personal property, they shall assess only the actual value of the property taken and used, and shall allow no consequential damages to the owners of such property.

SEC. 4. The Commissioners shall make report as is provided in Section 245 of said Code, and the Court shall take action upon such report as provided in Section 246, of said Code, the provisions of said sections being hereby made applicable to property that is personal and to such as is partly real and partly personal, as well as to land.

SEC. 5. After the rendition of judgment of condemnation by the Court, the plaintiff shall have the right to take possession of the property so condemned and appropriate the same to the public use defined in the judgment, in the same manner as though the property condemned had been real estate, in the manner defined in Section 247 of said Code.

SEC. 6. Exceptions to the judgment of the Court shall be allowed as in other proceedings, but no stay of judgment shall be allowed pending such exceptions, the effect of exceptions in this respect being governed by Section 248 of said Code, which is hereby made applicable, to personal property and property partly personal and partly real.

SEC. 7. The costs of the action, the fees of the Commissioners, powers of guardians, and the effect of the action upon persons not made parties defendant

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to the proceedings and not having actual or constructive notice thereof in such manner as the law requires, shall be governed by sections 249, 250, 252, 253 of said Code.

SEC. 8. The record of the final judgment, in an action for the condemnation of property under this act, shall state definitely the particular property and items thereof condemned for the public use, and the nature of the public use. The effect of such judgment and the payment or tender of payment in accordance with law of the amounts awarded for the property condemned, shall be to vest in the plaintiff the title to the property so described.

SEC. 9. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section 2 of "An Act Prescribing the Order of Procedure by the Commission in the Enactment of Laws," passed September 26, 1900.

SEC. 10. This act shall take effect on its passage.

Enacted, November 5, 1901.

[No. 1258.]

AN ACT Making additional provisions to those contained in Act Numbered One hundred and ninety, relating to the exercise of the right of eminent domain in cases where the exercise of such power is invoked by a railroad corporation for the purposes of constructing, extending, or operating its line.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. In addition to the method of procedure authorized for the exercise of the power of eminent domain by sections two hundred and forty-one to two hundred and fifty-three, inclusive, of Act Numbered One hundred and ninety, entitled "An Act providing a Code of Procedure in civil actions and special proceeding in the Philippine Islands," the procedure in this Act provided may be adopted whenever a railroad corporation seeks to appropriate land for the construction, extension, or operation of its railroad line.

SEC. 2. In case a railroad corporation is authorized to occupy any part of the public domain for the purpose of construction, extension, or operation of its line, it shall occupy only such portions of the public domain as are by its charter authorized, and the manner of acquiring possession thereof shall be such as is by its charter especially defined.

SEC. 3. (*As amended by Act No. 1592.*) Whenever a railroad corporation is authorized by its charter, or by general law, to exercise the power of eminent domain in the city of Manila or in any province, and has not obtained by agreement with the owners thereof the lands necessary for its purposes as authorized by law, it may in its complaint, which in each case shall be instituted in the Court of First Instance of the city of Manila if the land is situated in the city of Manila, or in the Court of First Instance of the province where the land is situated, join as defendants all persons owning or claiming to own, or occupying, any of the lands sought to be condemned, or any interest therein, within the city or province, respectively, showing, so far as practicable, the interest of each defendant and stating with certainty the right of condemnation, and describing the property sought to be condemned. Process requiring the defendants to appear in answer to the complaint shall be served upon all occupants of the land sought to be condemned, and upon the owners and all persons claiming interest therein, so far as known. If the title to any lands sought to be condemned appears to be in the Insular Government, although the lands are occupied by private individuals, or if it is uncertain whether the title is in the Insular Government or in private individuals, or if the title is otherwise so obscure or doubtful that the company can not with accuracy or certainty specify who are the real owners, averment may be made by the company in its complaint to that effect. Process shall be served upon residents and nonresidents in the same manner as provided therefor in Act Numbered One hundred and ninety, and the rights of minors and persons of unsound mind shall be safeguarded in the manner in such cases provided in said Act. The court may order additional and special notice in any case where such additional or special notice is, in its opinion, required.

"When condemnation proceedings are brought by any railway corporation, in any court of competent jurisdiction in the Philippine Islands, for the pur-

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pose of the expropriation of land for the proper corporate use of such railway corporation, said corporation shall have the right to enter immediately upon the possession of the land involved, after and upon the deposit by it with the Treasurer of the Philippine Islands of the value of the land, in money, as provisionally and promptly ascertained and fixed by the court having jurisdiction of the proceedings, said sum to be held by the Treasurer subject to the orders and final disposition of the court: *Provided, however*, That the court may authorize the deposit with the Insular Treasurer of a certificate of deposit of any depository of the Government of the Philippine Islands in lieu of cash, such certificate to be payable to the Insular Treasurer on demand in the amount directed by the court to be deposited. The certificate and the moneys represented thereby shall be subject to the orders and final disposition of the court. And in case suit has already been commenced on any land and the money deposited with the Insular Treasurer at the date of the passage of this Act, the said money may, upon proper order of the court, be withdrawn from the Treasury by the railway corporation which deposited the same, and a certificate of deposit, as above described, may be deposited in lieu thereof. And the court is empowered and directed, by appropriate order and writ if necessary, to place the railway corporation in possession of the land, upon the making of the deposit."

SEC. 2. The provisions of this Act shall apply to any railway corporation in the Philippine Islands although its franchise may in terms prescribe the deposit of actual cash.

SEC. 4. Commissioners appointed in pursuance of such complaint, in accordance with section two hundred and forty-three of Act Numbered One hundred and ninety, shall have jurisdiction over all the lands included in the complaint, situated within the city of Manila or within the province, as the case may be, and shall be governed in the performance of their duties by the provisions of sections two hundred and forty-four and two hundred and forty-five, and the action of the court upon the report of the commissioners shall be governed by section two hundred and forty-six, of Act Numbered One hundred and ninety.

SEC. 5. In case it shall appear from the pleadings or from the report of the commissioners, or the court shall otherwise be satisfied of the fact, that the true ownership of the lands sought to be condemned is uncertain and that there are conflicting claims to and diverse interests in any parcel of land sought to be condemned, the court, if satisfied that the real owners of the land have been notified and are before the court, shall, upon rendering judgment for condemnation and for payment of the sum or sums fixed by the court as just compensation for the land taken, order such sum or sums to be paid to the clerk of the court for the benefit of the persons who shall ultimately be adjudged entitled thereto. The sum or sums so awarded shall be governed by the rules laid down in section two hundred and forty-four of Act Numbered One hundred and ninety. Upon the payment by the plaintiff to the defendants of compensation as fixed by the judgment, or after tender to the defendants of the amount so fixed and payment of the costs, or in case the court shall order the compensation paid into court in accordance with the provisions of this section, the plaintiff shall have the right to enter in and upon the land so condemned, and to appropriate the same to the public use defined in the judgment. In case such payment is made into court, the clerk of the court shall be responsible upon his bond for the sum so paid and shall be compelled to receive it. The effect of a bill of exceptions in such case, the provisions as to costs, as to the fees of the commissioners, as to final judgment and its record and effect, as to the powers of a guardian, and as to persons not notified of the condemnation proceedings, shall be such as are defined in sections two hundred and forty-eight to two hundred and fifty-three, inclusive, of Act Numbered One hundred and ninety.

SEC. 6. Any party claiming an interest in money paid into court in accordance with the provisions of the preceding section may litigate in court his claim thereto, and the court shall apportion the sum so paid in among the various claimants thereto as justice shall require, and shall award such costs as to it may seem equitable, but the plaintiff in the condemnation proceedings shall not be a necessary party to the proceedings for the distribution of the sum or sums paid into court, nor be answerable for any costs arising from such litigation.

SEC. 7. The commissioners appointed to investigate and report upon damages to be awarded in condemnation proceedings under this Act may receive a greater compensation than that fixed by section two hundred and fifty, should the court in its order appointing the commissioners fix a greater compensation

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than that allowed by section two hundred and fifty of Act Numbered One hundred and ninety, but not to exceed ten pesos per day in all for each commissioner. If additional compensation is to be allowed, the sum to be allowed shall be fixed in the order of appointment.

SEC. 8. The court, in its order of appointment, may direct the commissioners to report when any particular portion of the lands situated within the city of Manila or in any province shall have been passed upon by the commissioners, and may render judgments upon such partial report, and direct the commissioners to proceed with their work as to subsequent portions of the land sought to be condemned, and may from time to time so deal with lands sought to be condemned within the city of Manila or province, as the case may be.

SEC. 9. The proper judge of the Court of First Instance may act upon complaints for condemnation of lands under this Act in vacation time as well as in term time, and may make appointments of commissioners, orders upon the reports of commissioners, and judgments of condemnation and for the awarding and apportioning of damages, at any time when it is convenient so to do, upon due notice to the parties in interest, and may make any orders to expedite proceedings in the same manner and to the same effect as though made in regular term time and in court. It shall be the duty of the court or judge to expedite these proceedings as much as the interests of justice will warrant.

SEC. 10. No judgments entered in pursuance of this Act, apportioning damages among rival claimants, shall be conclusive as to the real ownership of the land effected thereby in proceedings in the Court of Land Registration for the purpose of obtaining a certificate of title.

SEC. 11. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 12. This Act shall take effect on its passage.

Enacted, November 3, 1904.

FORECLOSURE OF MORTGAGE.[a]

Code of civil procedure.—Act. No. 190.

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SEC. 254. *Where action for foreclosure of real estate mortgage must be instituted.*—An action for the foreclosure of a mortgage, or other incumbrance, upon real estate, or an interest therein, must be brought in the Court of First Instance for the province in which the land, or some part thereof, lies.

SEC. 255. *The complaint in an action for foreclosure of a real estate mortgage.*—In an action for foreclosure of a real estate mortgage, or other incumbrance upon real estate, the complaint shall set forth the date, and due execution of the mortgage, its assignments, if any, the names and residences of the mortgagor and mortgagee, a description of the mortgaged premises, a statement of the date of the note or other obligation secured by the mortgage, and the amount claimed to be unpaid thereon, and the names and residences of all persons having or claiming an interest in the premises subordinate in right to that of the holder of the mortgage, all of whom shall be made defendants in the action.

SEC. 256. *Trial and judgment in foreclosure suit.*—If upon trial in such action, the Court shall find the facts set forth in the complaint to be true, it shall ascertain the amount due to the plaintiff upon the mortgage debt or obligation, including interest, and costs, shall render judgment for the sum so found due, and order that the same be paid into Court, on or before the first day of the next term of the Court immediately succeeding the one at which such order was made, and that in default of such payment, the land shall be sold to realize the mortgage debt and costs.

SEC. 257. *Sale of the mortgaged property.*—When the defendant, after being directed to do so, as provided in the last preceding section, failed to pay the principal, interest and costs, at the time directed in the order the Court shall order the property to be sold in the manner and under the regulations that govern sales of real estate under execution; but such sale shall not affect the rights of persons holding prior incumbrances upon the same estate, or a

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[a] See page 566.

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part thereof. The sale, when confirmed by decree of the Court, shall operate to divest the rights of all the parties to the action, and to vest their rights in purchaser. Should the Court decline to confirm the sale, for good cause shown, and should set it aside, it shall order a re-sale in accordance with law.

SEC. 258. *Disposition of proceeds.*—The money arising from the sale of mortgaged property, under the regulations hereinbefore prescribed, shall after deduction of costs of sale, be paid to the person foreclosing the mortgage, and when there shall be any surplus, after paying off such mortgage, or other incumbrance, the same shall be paid to junior incumbrances in the order of their priority, to be ascertained by the Court, or if there be no such incumbrances, or there be a surplus after payment of such incumbrances, then to the mortgagor, or his agent or to the person entitled to it.

SEC. 259. *Disposition of proceeds in case the debt is not all due.*—If the debt for which the mortgage or incumbrance was held, is not all due, so soon as sufficient of the property has been sold to pay the amount due, with costs, the sale must cease; and afterwards, as often as more becomes due for principal or interest, the Court may, on motion, order more to be sold. But if the property cannot be sold in portions without injury to the parties, the whole shall be ordered to be sold in the first instance, and the entire debt and costs paid, there being a rebate of interest where such rebate is proper.

SEC. 260. *Judgment for balance after sale of property.*—Upon the sale of any real property, under a decree for a sale to satisfy a mortgage or other incumbrance thereon, if there be a balance due to the complainant, after applying the proceeds of the sale, the Court, upon motion, shall give a decree against the defendant for any such balance for which, by the record of the case, he may be personally liable to the plaintiff upon which execution may issue immediately if the balance is all due at the time of the rendition of the decree, otherwise the plaintiff shall be entitled to execution at such time as the balance remaining would have become due by the terms of the original contract which time shall be stated in the decree.

SEC. 261. *Final record.*—The final record in the action shall set forth in brief, the petition and other pleadings, judgment, orders, the proceedings under the order of sale, and the decree confirming the same, and the name of the purchaser, with a description of the estate by him purchased. A certified copy of such record shall be recorded in the office of the registrar of deeds for the province in which the estate is situated.

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Enacted Aug. 7, 1901.

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LAND REGISTRATION.

THE LAND REGISTRATION ACT AS AMENDED TO NOVEMBER 1, 1907.

[No. 496.]

AN ACT To provide for the adjudication and registration of titles to lands in the Philippine Islands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The short title of this Act shall be "The Land Registration Act."

SEC. 2. (*As amended by Act No. 659.*) A court is hereby established to be called the "Court of Land Registration," which shall have exclusive jurisdiction of all applications for the registration under this Act of title to land or buildings or an interest therein within the Philippine Islands, with power to hear and determine all questions arising upon such applications, and also have jurisdiction over such other questions as may come before it under this Act, subject, however, to the right of appeal, as hereinafter provided. The proceedings upon such applications shall be proceedings *in rem* against the land and the buildings and improvements thereon, and the decree shall operate directly on the land and the buildings and improvements thereon, and vest and establish title thereto.[a]

The court shall hold its sittings in Manila, but may adjourn from time to time to such other places as the public convenience may require, and may hold sessions at any time in the capital of any province. In the city of Manila, the Municipal Board, and in the provinces, the provincial board, shall provide suitable rooms for the sittings of the Court of Land Registration in the same building with, or convenient to, the office of the register of deeds.

All necessary books, printed blanks, stationery, and office equipment necessary for conducting the business of the court and the clerk shall be paid for from the Treasury of the Philippine Archipelago.[b]

The court shall have jurisdiction throughout the Philippine Archipelago, and shall always be open, except on Sundays and holidays established by law. It shall be a court of record, and shall cause to be made a seal, and to be sealed therewith all orders, process, and papers made by or proceeding from the court and requiring a seal. All notices, orders, and process of such court may run into any province and be returnable, as the court may direct.

The court shall from time to time make general rules and forms for procedure, conforming as near as may be to the practice in special proceedings in Courts of First Instance, but subject to the express provisions of this Act and to general laws. Such rules and forms before taking effect shall be approved by the judges of the Supreme Court or a majority thereof.

In this Act, except where the context requires a different construction, the word "court" shall mean the Court of Land Registration.

SEC. 3. The Civil Governor, with the advice and consent of the Philippine Commission, shall appoint two judges of the Court of Land Registration, one

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[a] See Act No. 627, page 479; See Act No. 926, page 462.

[b] Act No. 659:

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SEC. 2. All sums of money that have been paid or directed to be paid by the city of Manila for any of the items named in the preceding section, for the benefit of the Court of Land Registration, shall be repaid to the city of Manila from the Treasury of the Philippine Archipelago.

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Enacted March 4, 1903.

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of whom shall be appointed, commissioned, and qualified as judge of the Court of Land Registration, and the other as associate judge thereof, each of whom may be removed by the Civil Governor, with the advice and consent of the Philippine Commission, and any vacancy shall be filled in the manner in this section provided. Such further associate judges of the Court of Land Registration shall be appointed in the manner in this section provided, as experience shall prove to be necessary, but the necessity for such additional judges shall be determined by act of the Philippine Commission.

SEC. 4. (*As amended by Acts Nos. 1648 and 1699.*) The authority and jurisdiction of the Court of Land Registration shall begin and take effect as soon as the judges thereof are appointed and qualified in the manner required by law for judicial officers. The court may be held by a single judge, and when so held shall have all the authority and jurisdiction committed to said court. Different sessions may be held at the same time, either in the same province or in different provinces, as the judges may decide, and they shall so arrange sessions as to insure a prompt discharge of the business of the court.

All cases arising in the Court of Land Registration in the city of Manila shall be assigned to the regular judges of the court by rotation, as nearly as may be, and all cases arising in said court outside of the city of Manila shall be assigned by districts to the regular judges and the judges at large of the Court of First Instance performing the duties of judges of the Court of Land Registration. The limits of said districts shall be determined by agreement among all of the judges serving on the court. The judge to whom a case is once assigned shall thereafter have exclusive authority and jurisdiction therein unless and until he shall be absent from the Philippine Islands, or shall have voluntarily transferred such case to another judge, or such transfer shall have been authorized by the Secretary of Finance and Justice: *Provided*, That any judge of the Court of First Instance outside of the city of Manila shall, whenever directed in writing to do so by the Secretary of Finance and Justice, hear and make findings of fact in land-registration cases at the times and places prescribed by law for holding regular or special terms of the Court of First Instance in his judicial district whenever any application or applications under this Act shall have been duly published, mailed, and posted for hearing at any such times and places. For the purposes of any such hearing such judge of the Court of First Instance shall exercise all the powers exercised for like purposes by judges of the Court of Land Registration, including the power to determine whether the application has been duly published, mailed, and posted for hearing, and the power of adjournment to such times and places as may be convenient, and, after the hearing, such judge of the Court of First Instance shall return the application and all papers and documents filed in connection therewith and all evidence presented in support thereof or in opposition thereto, together with his findings of fact, by official messenger or registered mail, to the clerk in Manila, who shall thereupon transmit the papers and record in the case to the judge to whom the case has been assigned for decision. Such judge to whom the case has been assigned may, of his own motion, or on motion for a new trial made by any party to the case on proper grounds and in due time, reopen the case, and, with the previous approval in writing of the Secretary of Finance and Justice, return it to the judge of the Court of First Instance of the district in which the findings of fact were originally made for further hearing. Such judge of the Court of First Instance shall thereupon conduct such further hearing and return the application, papers, documents, and evidence and any further findings of fact to the clerk in Manila in the manner hereinbefore provided, to be again delivered to the judge to whom the case has been assigned. But the judges of the Court of Land Registration shall have the same powers of appointing referees in all cases coming before them as are conferred by law upon judges of the Courts of First Instance.

SEC. 5. Citations, orders of notice, and all other process issuing from the court shall be under the seal of the court and signed by the judge or clerk thereof, and shall be served in the manner provided for the service of process in the Code of Procedure in Civil Actions and Special Proceedings, and by the officers therein designated as officers of the court, unless otherwise specially ordered in this Act.

SEC. 6. (*As amended by Act No. 1108.*) In case of a vacancy in the office of judge of the Court of Land Registration, or of his absence or inability to perform his duties, the associate judge shall perform them until the vacancy is filled or any disability is removed.

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Any judge at large of the Court of First Instance, appointed by virtue of Act Three hundred and ninety-six, may likewise be required to perform the duties of judge of the Court of Land Registration in any province in the Philippine Islands or in the city of Manila, when directed in writing to do so by the Civil Governor, in which case his acts, proceedings, and judgments shall be of the same validity as though he were a regular judge or associate judge of the Court of Land Registration in the city of Manila or in the province in which he shall perform such duties. In case such order is given, the judge performing duties as judge of the Court of Land Registration shall receive an allowance for traveling expenses in the same manner and to the same extent as he would receive if performing the duties of a judge of the Court of First Instance.[a]

SEC. 7. (*As amended by Act No. 1648.*) There shall be a clerk and an assistant clerk of the Court of Land Registration, who shall be appointed by the Attorney-General, with the approval of the Secretary of Finance and Justice. The clerk and assistant clerk shall perform their duties under the control and supervision of the senior judge of the court and may be removed from office for cause by said senior judge.

"The clerk shall have authority, subject to the provisions of the Civil Service Law and with the approval of the Attorney-General, to appoint and employ the necessary deputies, assistants, clerks, translators, stenographers, typewriters, messengers, and other subordinate employees which may be authorized by law.

"The assistant clerk shall act as chief deputy to the clerk of the court and shall perform such other duties as may be assigned to him by the senior judge or the clerk of the court. In case of the death or disability of the clerk, the assistant clerk shall perform the duties of clerk until the vacancy is filled or the disability is removed: *Provided, however*, That any judge of the Court of Land Registration having jurisdiction over any particular case may issue such orders to the clerk with reference to such case as he may deem proper, without the intervention of the senior judge, and the clerk shall comply therewith.

SEC. 8. (*As amended by Act No. 1648.*) Except as otherwise herein provided, the clerk shall have the custody and control, under the general direction of the senior judge of the court, of all papers and documents filed with him under the provisions of this Act, and shall carefully number and index the same. Said papers and documents shall be kept in the city of Manila, in an office to be called the "Land Registration Office," which shall be in the same building as the Court of Land Registration or near said building.

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[a] NOTE:

[No. 1153.]

AN ACT Providing that certain duties in relation to the Bureau of Justice and the Bureau of the Insular Treasury, now required by law to be performed by the Civil Governor, shall be performed by the Secretary of Finance and Justice.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The following administrative acts relating to the Bureau of Justice and to the Bureau of the Insular Treasury, now authorized by law to be performed by the Civil Governor, shall hereafter be performed by the Secretary of Finance and Justice:

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(*l*) To issue an order naming the judge of the Court of Land Registration and judge of the Court of Customs Appeals who shall remain on duty during court vacation, and to direct any judge of the Court of Customs Appeals who is assigned to vacation duty, when in his judgment the emergency shall so require, to hold during the vacation period a special term of the Court of First Instance in any district, either to hear civil or criminal causes and to enter final judgment therein, as provided in section one of Act Numbered Ten hundred and fifty-six; and likewise to assign five months' vacation to a judge of the Court of Land Registration or of the Court of Customs Appeals, as provided in the section and Act last named; likewise to grant leaves of absence to judges of the Court of Customs Appeals and of the Court of Land Registration, a duty which is now not clearly provided for by existing law.

(*m*) To require a judge at large of the Court of First Instance to perform the duties of judge of the Court of Land Registration in any province of the Philippine Islands or in the city of Manila, as provided in section six of Act Numbered Four hundred and ninety-six, as amended by section one of Act Numbered Eleven hundred and eight.

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SEC. 2. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-sixth, nineteen hundred.

SEC. 3. This Act shall take effect on its passage.

Enacted, May 11, 1904.

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The clerk shall attend the sessions of the court and keep a docket of all causes, and he shall affix the seal of the court to all process or papers proceeding therefrom and requiring a seal.

When an application is published for hearing at the time and place for holding a regular or special term of the Court of First Instance, as provided in section four of this Act, the clerk shall immediately send the original application, and all papers and documents filed in connection therewith, by official messenger or registered mail, to the judge of the Court of First Instance who is to conduct the hearing.

SEC. 9. (*As amended by Act No. 809.*) The clerk may act in the city of Manila and in any province, and after land has been registered under this Act he may make all memoranda affecting the title, and enter and issue certificates of title as provided herein.

The clerk and assistant clerk of the court, and any deputy thereof acting as clerk during an adjourned session of the court in any province, are hereby made ex officio notaries public and are authorized to perform within the Philippine Islands all the duties appertaining to the office of notary public.

SEC. 10. (*As amended by Acts Nos. 614 and 1699.*) There shall be a register of deeds in the city of Manila and one in each province. The register of deeds for the city of Manila shall be appointed at a salary of four thousand pesos per annum and removed in the manner provided for the appointment and removal of judges by section three. The provincial fiscals and the attorney for the Moro Province shall perform the duties of the register of deeds in their respective provinces. The duties of the register of deeds in the Provinces of Benguet, Nueva Vizcaya, Lepanto-Bontoc, Zambales, Palawan, and Agusan shall be performed by the respective provincial treasurers of said provinces. The registers of deeds, after any land within their respective districts has been registered under this Act, shall have the same authority as the clerk of the Court of Land Registration to make all memoranda affecting the title of such land, and to enter and issue new certificates of title as provided herein, and to affix the seal of the court to such certificates and duplicate certificates of title; but in executing the provisions of this Act the registers of deeds shall be subject to the general direction of the Court of Land Registration, in order to secure uniformity throughout the Islands, and their official designation shall be register of deeds for the province or for the city of Manila, in which their duties are to be performed, as the case may be.[a]

SEC. 11. (*As amended by Act No. 1699.*) The clerk of the Court of Land Registration and all registers of deeds shall be sworn before any official authorized to administer oaths, and a record thereof shall be made in the records of the court. They shall each give a bond to the Government of the Philippine Islands for the benefit of whom it may concern in a sum to be fixed by the court for the faithful performance of their official duties, before entering upon the same. The judge and the associate judges and the clerk of the Court of Land Registration and all registers of deeds will have power to administer oaths in all matters and cases in which an oath is required, whether pertaining to the registration of lands or otherwise. The clerk and his deputy and all registers of deeds shall keep an accurate account of all moneys received, as fees or otherwise, which shall be subject to examination by the Insular Auditor in the city of Manila and by the district auditors in the several provinces, and to revision thereof by the Insular Auditor, and they shall pay over such moneys at the end of each calendar month to the Insular Treasurer, except such moneys as are otherwise disposed of by the provisions of section thirteen of this Act.

In case of a vacancy in the office of the register of deeds for the city of Manila, or his absence or disability, the clerk of the Court of Land Registration shall perform the duties of the register. In case of a vacancy in the office of provincial fiscal or that of the attorney for the Moro Province, or their absence or disability, the deputy fiscal or assistant attorney, or, if there is no deputy or assistant, the provincial treasurer, shall perform the duties of the register of deeds. The clerk of the Court of Land Registration and all registers of deeds may require a bond of indemnification from all deputies, assistants, and employees in their respective offices. The register of deeds for the

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[a] Act No. 1288, enacted Jan. 23, 1905.

SECTION 1. Registers of deeds and provincial treasurers who are performing the duties of registers of deeds are hereby authorized and directed to perform the duties of commercial registers as defined in Title Two of the Code of Commerce: *Provided, however,* That such registers of deeds shall not be required to register vessels or to keep a register of vessels as required in said title.

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city of Manila may appoint such deputies, assistants, clerks, stenographers, and translators as may be authorized by law.

SEC. 12. (*As amended by Acts No. 700 and 1108 repealed by Act No. 1699.*)

SEC. 13. (*As amended by Acts Nos. 809, 1108, 1312 and 1699.*) The salary of the judge of the Court of Land Registration shall be ten thousand pesos per annum, and that of the associate judge shall be nine thousand pesos per annum, and that of the clerk of the court shall be five thousand pesos per annum; the salary of any associate judge appointed after July first, nineteen hundred and five, under this Act shall be eight thousand pesos per annum for the first two years of service, and thereafter nine thousand pesos per annum.

All salaries and expenses of the court, including those for necessary interpreters, translators, stenographers, typewriters, and other employees, as well as those of deputy or assistant clerks duly authorized, shall be paid from the Insular Treasury, but the salary of the register of deeds for the city of Manila and of all of his deputies, assistants of clerks duly authorized and appointed, and all the expenses of every kind incident to the office of register of deeds, including necessary books and stationery, shall be paid out of the respective provincial treasuries or out of the Insular Treasury from funds belonging to the city of Manila, as the case may be. All fees payable under this Act for the services of the clerk of the Court of Land Registration shall be paid into the Insular Treasury. All fees payable under this Act for the services of the register of deeds or his deputy or clerks, including those for entry of original certificate of title, issuing all duplicates thereof, for the registration of instruments, making and attesting copies of memorandum on instruments, for filing and registering adverse claims, for entering statement of change of residence or post-office, for entering any note on registration book, for registration of a suggestion of death or notice of proceedings in bankruptcy, insolvency, or the like, for the registration of a discharge of a lease or a mortgage or instrument creating an incumbrance, for the registration of any levy or any discharge or dissolution of attachment or levy or of any certificate of or receipt for payment of taxes or a notice of any pending action, of a judgment or decreee, for indorsing of any mortgage lien or other instrument, memorandum of partition, certified copies of registered instruments, shall be paid into the appropriate provincial treasury or into the Insular Treasury for the city of Manila, as the case may be.

All fees payable under this Act for services by sheriff or other officer shall be paid to the officer or person entitled thereto.

Registers of deeds shall pay over to the provincial treasury or to the Insular Treasury, as the case may be, at the end of each calendar month, all funds received by them in accordance with the provisions of this Act.[a]

SEC. 14. (*As amended by Acts No. 1108 and 1484.*) Every order, decision, and decree of the Court of Land Registration may be reviewed by the Supreme Court in the same manner as an order, decision, decree, or judgment of a Court of First Instance might be reviewed, and for that purpose sections one hundred and forty-one, one hundred and forty-two, one hundred and forty-three, four hundred and ninety-six, four hundred and ninety-seven (except that portion thereof relating to assessors), four hundred and ninety-nine, five hundred, five hundred and one, five hundred and two, five hundred and three, five hundred and four, five hundred and five, five hundred and six, five hundred and seven, five hundred and eight, five hundred and nine, five hundred and eleven, five hundred and twelve, five hundred and thirteen, five hundred and fourteen, five hundred and fifteen, five hundred and sixteen, and five hundred and seventeen of Act Numbered One hundred and ninety, entitled "An Act providing a Code of Procedure in Civil Actions and Special Proceedings in the Philippine Islands," are made applicable to all the proceedings of the Court of Land Registration and to a review thereof by the Supreme Court, except as otherwise provided in this section: *Provided, however*, That no certificates of title shall be issued

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[a] Act No. 1699—Enacted Aug. 30, 1907.

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SEC. 11. In lieu of one examiner of titles for the city of Manila, which position is by this Act abolished, authority is hereby given for the employment by the Court of Land Registration of a clerk of class eight, and the sum of three thousand pesos, which was appropriated for the payment of the salary of the examiner of titles under the provisions of Act Numbered Sixteen hundred and seventy-nine, is hereby made available for the payment of the salary of such clerk so authorized to be employed.

SEC. 12. Section twelve of Act Numbered Four hundred and ninety-six, Acts Numbered Six hundred and six, Eight hundred and ninety-four, Nine hundred and ninety-one, and Eleven hundred and seven, and section sixty of Act Numbered Nine hundred and twenty-six, and all Acts or parts of Acts in conflict with this Act are hereby repealed.

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by the Court of Land Registration until after the expiration of the period for perfecting a bill of exceptions for filing: *And provided further*, That the Court of Land Registration may grant a new trial in any case that has not passed to the Supreme Court, in the manner and under the circumstances provided in sections one hundred and forty-five, one hundred and forty-six, and one hundred and forty-seven of Act Numbered One hundred and ninety: *And provided also*, That the certificates of judgment to be issued by the Supreme Court, in cases passing to it from the Court of Land Registration, shall be certified to the clerk of the last named court as well as the copies of the opinion of the Supreme Court: *And provided also*, That in the bill of exceptions to be printed no testimony or exhibits shall be printed except such limited portions thereof as are necessary to enable the Supreme Court to understand the points of law reserved. The original testimony and exhibits shall be transmitted to the Supreme Court. *And provided further*, That the period within which the litigating parties must file their appeals and bills of exceptions against the final judgment of the Court of Land Registration shall be thirty days, counting from the date on which the party received a copy of the decision, which period may, in the discretion of the court, in writing be extended to sixty days if the hearing of the cases was had in the provinces, or if they relate to lands situated outside of the city of Manila.[a]

Where the associate judges, or the judge and an associate judge, sitting together in any proceeding in the Court of Land Registration, shall disagree as to any decision, they shall certify the fact of their disagreement and the record to the Supreme Court of the Islands, which shall thereupon proceed to examine the case and issue a mandate to the Court of Land Registration as to the judgment that should be rendered.

SEC. 15. At the end of the proceedings on appeal, the clerk of the appellate court in which final decision was made shall certify to the Court of Land Registration the final decision on the appeal, and the Court of Land Registration shall enter the final decree in the case, in accordance with the certificate of the clerk of the appellate court in which final decision was made.

SEC. 16. If the party appealing does not prosecute his appeal within the time limited, the original order, decision, or decree shall stand as if no appeal had been taken.

SEC. 17. (*As amended by Acts Nos. 1108, 1648 and 1680.*) The Court of Land Registration, in all matters over which it has jurisdiction, may enforce its orders, judgments, or decrees in the same manner as orders, judgments, and decrees are enforced in the Court of First Instance, including a writ of possession directing the governor or sheriff of any province, or the sheriff of the city of Manila, to place the applicant in possession of the property covered by a decree of the court in his favor; and, upon the request of the judge of the court of Land Registration, the governor or sheriff of any province or the sheriff of the city of Manila, as the case may be, shall assign a deputy to attend the sittings of the court in that province or city; and for the purpose of attending the sessions of the court and enforcing good order in and about the court room, the provincial governor is hereby authorized to designate a provincial guard or a member of the municipal police of the town in which the court is

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[a] NOTE:

[Act No. 1648.]

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SEC. 8. Upon a decision being rendered by any judge serving on the Court of Land Registration, either party in interest may, within thirty days after the decision is rendered by such judge, petition the court *in banc*, consisting of all the judges serving on the court, or at least three of said judges, for a rehearing of the case, and, if it shall appear to such court *in banc* that the decision on which a rehearing is asked is in conflict with any previous decision of the court, or of any judge thereof, or with any decision of the Supreme Court of these Islands, or of any other competent appellate tribunal, then the court *in banc*, may, in its discretion, by vote of a majority of its members, grant the rehearing petitioned for, annul the decision of the single judge, and rehear the case sitting *in banc*; and the decision of the court *in banc* shall be the decision of the Court of Land Registration in the case, and may be regularly appealed from as in other cases.

SEC. 9. All Acts and parts of Acts inconsistent with this Act are hereby, to that extent, repealed.

SEC. 10. The public good requiring the speedy enactment of this bill, the passage of the same is hereby expedited in accordance with section two of "An Act prescribing the order of procedure by the Commission in the enactment of laws," passed September twenty-six, nineteen hundred.

SEC. 11. This Act shall take effect on July first, nineteen hundred and seven.

Enacted, May 16, 1907.

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held; or if none such is available, to appoint a bailiff, at a salary not to exceed twenty-five pesos per month, to be paid from the provincial treasury, for such time as the court may be in session in said province.

The Court of Land Registration, in all matters over which it has jurisdiction, may issue an injunction for the protection of either or any of the parties in interest in the following cases:

(1) When it appears by the application, by verified petition, or by affidavits that the commission or continuance of some act during the proceedings for registration of title would produce waste or great or irreparable injury to the subject-matter of the registration proceedings.

(2) When it appears during the pendency of the proceedings that either or any of the parties in interest is doing, or is about to do, or is threatening to do, or is procuring or suffering to be done, some act in violation or to the prejudice of the rights of another party to the action respecting the subject-matter of the proceedings and tending to render the judgment ineffectual.

Except as herein provided, preliminary and permanent injunctions shall be obtained, enforced, dissolved, or modified in the same manner as such injunctions are obtained, enforced, dissolved, or modified under the provisions of the Code of Civil Procedure.[a]

SEC. 18. Costs shall be taxed in contested cases in the Court of Land Registration in the same manner and for the same items of cost as in Courts of First Instance. where no different provision is made.

ORIGINAL REGISTRATION.

SEC. 19. (*As amended by Acts Nos. 809 and 1108.*) Application for registration of title may be made by the following persons, namely:

First. The person or persons claiming, singly or collectively, to own the legal estate in fee simple.

Second. The person or persons claiming, singly or collectively, to have the power of appointing or disposing of the legal estate in fee simple.

Third. The person or persons claiming, singly or collectively, to own or hold any land under a possessory information title, acquired under the provisions of the Mortgage Law of the Philippine Islands and the general regulations for the execution of same.

Fourth. Infants or other persons under disability may make application by their legally appointed guardians, but the person in whose behalf the application is made shall be named as applicant by the guardian.

The Government of the United States, or of the Philippine Islands, or of any province or municipality therein, may make application through any agency by it respectively and duly authorized. Foreign corporations may apply for and secure registration of title to lands in the name of the corporation, subject only to the limitations applied or to be applied to domestic corporations. Article eighteen of the royal decree of February thirteenth, eighteen hundred and ninety-four, concerning the adjustment and sale of public lands in the Philippine Islands, and article seventy-seven of the regulations for the execution of the same, together with any other provision or provisions of existing law limiting or prohibiting the holding of land in the Philippine Islands by aliens or by foreign associations, companies, or commercial bodies, are hereby repealed.

Fifth. Corporations may make application by any officer duly authorized by vote of the directors.

In case no examiner of titles has been appointed for a judicial district, or in other cases where such action is deemed advisable, the Secretary of Finance and Justice may issue an order that the register of deeds or the provincial fiscal of any province shall perform the duties of examiner of titles within his province, either permanently or until a regular examiner of titles shall be appointed for the judicial district within which the province lies; such order may be revoked at any time by the Secretary of Finance and Justice. In case such order is issued, the register of deeds or the provincial fiscal, as the case may be, shall be entitled, in addition to his regular salary as register of deeds or as fiscal, to receive from the clerk of the court one-half the fee of five dollars provided by law for an examination of title, and the remainder of the fee and the percentage on the value of the land shall be paid into the

NOTE:

[a] Act No. 1680.

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SEC. 4. All Acts or parts of Acts in conflict with this Act are hereby repealed.

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Insular Treasury, notwithstanding the provisions of section thirteen of this Act or any other provisions of existing law.

The court is authorized to detail an examiner of titles appointed for one judicial district to perform duties in another district whenever in its judgment the public interest will be served thereby.

The judges of the Court of Land Registration and the clerk of the court or any deputy thereof, and the examiners of titles, in going to and from their respective places of residence to other provinces upon the business of the court, shall be allowed their actual and necessary traveling expenses and actual subsistence expenses, the latter not to exceed two dollars, money of the United States, per day. When transportation by steamship, Government transport, or otherwise includes subsistence, no per diem shall be paid or allowed for such portion of the journey.

But the authority given to the foregoing five classes of persons is subject to the following provisos:

(*a*) That one or more tenants for a term of years shall not be allowed to make application except jointly with those claiming the reversionary interest in the property which makes up the fee simple at common law.

(*b*) That a mortgagor shall not make application without the consent in writing of the mortgagee.

(*c*) That a married woman shall not make application without the consent in writing of her husband unless she holds the land as her separate property or has a power to appoint the same in fee simple, or has obtained a decree of the court authorizing her to deal with her real estate as though she were sole and unmarried.

(*d*) That one or more tenants claiming undivided shares less than a fee simple in the whole land described in the application shall not make application except jointly with the other tenant owning undivided shares, so that the whole fee shall be represented in the action.

But, notwithstanding the foregoing provisos, if the holder of a mortgage upon the land described in the application does not consent to the making of the application, it may be entered nevertheless and the title registered subject to such mortgage, which may be dealt with or foreclosed as if the land subject to such mortgage had not been registered. But the decree of registration in such case shall state that registration is made subject to such mortgage, describing it, and shall provide that no subsequent certificate shall be issued and no further papers registered relating to such land after a foreclosure of such mortgage.

Instruments known as *pacto de retro*, made under sections fifteen hundred and seven and fifteen hundred and twenty of the Spanish Civil Code in force in these Islands, may be registered under this Act, and application for registration thereof may be made by the owner who executed the *pacto de retro* sale under the same conditions and in the same manner as mortgagors are authorized to make application for registration.

SEC. 20. The application may be filed with the clerk of the Court of Land Registration, or with the register of deeds of the province or city in which the land or any portion thereof lies. Upon filing his application the applicant shall forthwith cause to be filed with the register of deeds for said city or province a memorandum stating that application for registration has been filed, and the date and place of filing, and a copy of the description of the land contained in the application. This memorandum shall be recorded and indexed by the register with the records of deeds. Each register of deeds shall also keep an index of all applications in his province or city, and, in every case where the application is filed with him, shall transmit the same, with the papers and plans filed therewith, and such memorandum when recorded, to the clerk of the Court of Land Registration.

SEC. 21. (*As amended by Acts Nos. 809 and 1108.*) The application shall be in writing, signed and sworn to by the applicant, or by some person duly authorized in his behalf. All oaths required by this Act may be administered by any officer authorized to administer oaths in the Philippine Islands. If there is more than one applicant, the application shall be signed and sworn to by and in behalf of each. It shall contain a description of the land and shall state whether the applicant is married; and, if married, the name of the wife or husband; and, if unmarried, whether he or she has been married, and, if so, when and how the married relation terminated. If by divorce, when, where, and by what court the divorce was granted. It shall also state the name in

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full and the address of the applicant, and also the names and addresses of all occupants of the land and of all adjoining owners, if known; and, if not known, it shall state what search has been made to find them. It may be in form as follows:

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

To the Honorable Judge of the Court of Land Registration:

I (or we), the undersigned, hereby apply to have the land hereinafter described brought under the operations of the Land Registration Act, and to have my (or our) title therein registered and confirmed. And I (or we) declare: (1) That I am (or we are) the owner (or owners) in fee simple (or by possessory information title) of a certain parcel of land with the buildings (if any; if not, strike out the words "with the buildings"); situated in (here insert accurate description). (2) That said land at the last assessment for taxation was assessed at _____ dollars; and the buildings (if any) at _____ dollars. (3) That I (or we) do not know of any mortgage or incumbrance affecting said land, or that any other person has any estate or interest therein, legal or equitable, in possession, remainder, reversion, or expectancy (if any, add "other than as follows," and set forth each clearly). (4) That I (or we) obtained title (if by deed, state name of grantor, date and place of record, and file the deed or state reason for not filing. If in any other way, state it). (5) That said land is _____ occupied (if occupied, state name in full and place of residence and post-office address of occupant and the nature of his occupancy. If unoccupied, insert "not"). (6) That the names and addresses so far as known to me (or us) of the owners of all lands adjoining the above land are as follows (same directions as above). (7) That I am (or we are) married. (Follow literally the directions given in the prior portions of this section.) (8) That my (or our) full name (or names), residence and post-office address is (or are) as follows:

_____

Dated this _____ day of _____ in the year nineteen hundred and _____

(Signature)_____

(Schedule of documents.)

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

Province (or city) of _____(date).

Then personally appeared the above-named _____ known to me to be the signer (or signers) of the foregoing application, and made oath that the statements therein, so far as made of his (or their) own knowledge, are true, and so far as made upon information and belief, that he (or they) believe them to be true. The cedula certificate__ of the applicant (or applicants, or representative) was exhibited to me, being No. _____, issued at _____, dated _____, 19__

Before me,

_____

(Notary public or other official authorized to administer oaths.)

SEC. 22. If the applicant is not a resident of the Philippine Islands, he shall file with his application a paper appointing an agent residing in the Philippine Islands, giving his name in full, and his post-office address, and shall therein agree that the service of any legal process in proceedings under or growing out of the application shall be of the same legal effect if served upon the agent as if upon the applicant if within the Philippine Islands. If the agent dies or becomes insane, or removes from the Philippine Islands, the applicant shall at once make another appointment; and if he fails to do so, the court may dismiss the application.

SEC. 23. Amendments to the application, including joinder, substitution, or discontinuing as to parties, shall be allowed by the court at any time upon terms that are just and reasonable. But all amendments shall be in writing, signed and sworn to like the original.

SEC. 24. (*As amended by Act No. 1108.*) The application may include two or more contiguous parcels of land, or two or more parcels constituting one holding under one and the same title, if within the same province or city, and like-

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wise two or more parcels constituting one holding and within the same province or city, though not under one and the same title, nor contiguous, in cases where neither of the several parcels of land included in the one application exceeds one hundred dollars in value. But two or more persons claiming in the same parcels different interests, which, collectively, make up the legal estate in fee simple in each parcel, shall not join in one application for more than one parcel, unless their interests are alike in each and every parcel. The court may at any time order an application to be amended by striking out one or more parcels, or by severance of the application.

SEC. 25. If the application described the land as bounded on a public or private way or road, it shall state whether or not the applicant claims any and what land within the limits of the way or road, and whether the applicant desires to have the line of the way or road determined.

SEC. 26. The applicant shall file with the application a plan of the land, and all original muniments of title within his control mentioned in the schedule of documents, such original muniments to be produced before the examiner or the court at the hearing when required. When an application is dismissed or discontinued, the applicant may, with the consent of the court, withdraw such original muniments of title.

SEC. 27. When an application is made subject to an existing recorded mortgage, the holder of which has consented thereto, or to a recorded lease, or when the registration is to be made subject to such mortgage or lease executed after the time of the application and before the date of the transcription of the decree, the applicant shall, if required by the court, file a certified copy of such mortgage or lease, and shall cause the original, or, in the discretion of the court, a certified copy thereof to be presented for registration before the decree of registration is entered, and no registration fee shall be charged for registering such original mortgage or lease or such certified copy.

SEC. 28. The court may by general rule require facts to be stated in the application in addition to those prescribed by this Act, and not inconsistent therewith, and may require the filing of any additional papers.

SEC. 29. After the filing of the application and before registration the land therein described may be dealt with and instruments relating thereto shall be recorded, in the same manner as if no application had been made; but all instruments left for record relating to such land shall be indexed in the usual manner in the registry index and also in the index of applications. As soon as an application is disposed of, the clerk of the Court of Land Registration shall make a memorandum stating the disposition of the case and shall send the same to the register of deeds for the proper province or city, who shall record and index it with the records of deeds and in the index of applications. If the proceedings upon the application end in a decree of registration of title, the land included therein shall, as soon as said decree is transcribed, as hereinafter provided in section forty-one, become registered land, and thereafter no deeds or other instruments relating solely to such land shall be recorded with the records of deeds, but shall be registered in the registration book and filed and indexed with records and documents relating to registered lands.

SEC. 30. (*As amended by Acts Nos. 1648 and 1699.*) If the application is filed with the clerk, he shall forthwith forward it by registered mail to the register of deeds of the province or city in which the land or any portion thereof lies. Immediately upon the receipt of the application, whether from the applicant or the clerk, the register of deeds shall search the books and records of his office and attach to the application a certificate stating that the land to which the application relates does not appear in such books or records, or setting forth copies of all entries of such land, as the fact may be, and shall transmit the application, such certificate, and the papers, plans, and memorandum mentioned in section twenty of this Act by the first registered mail to the clerk in Manila.

SEC. 31. (*As amended by Acts Nos. 1648 and 1678.*) Upon receipt of the application, certificate, and accompanying papers from the register of deeds, the clerk shall cause notice of the filing of the application to be published twice, in successive issues of the Official Gazette, in both the English and the Spanish languages. The notice shall be issued by order of the court, attested by the clerk and shall be in form substantially as follows:

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[a] REGISTRATION OF TITLE.

PROVINCE (OR CITY) OF _____

COURT OF LAND REGISTRATION.

To [here insert the names of all persons appearing to have an interest and the adjoining owners so far as known], *and to all whom it may concern:*

Whereas an application has been presented to said court by [name or names, and addresses in full] to register and confirm his (or their) title in the following described lands [insert description], you are hereby cited to appear at the Court of Land Registration, to be held at_____, in said Province (or city) of _____, on the_____ day of _____, A. D., nineteen hundred and _____, at _____ o'clock in the forenoon, to show cause, if any you have, why the prayer of said application shall not be granted. And unless you appear at such court, at the time and place aforesaid, your default will be recorded and the said application will be taken as confessed, and you will be forever barred from contesting said application or any decree entered thereon.

Witness: _____, judge of said court, this _____ day of _____, in the year nineteen hundred and _____

Attest: _____

Clerk of said Court.

SEC. 32. (*As amended by Act No. 809.*) The return of said notice shall not be less than twenty nor more than sixty days from date of issue. The court shall also, within seven days after publication of said notice in the newspapers, as hereinbefore provided, cause a copy of the notice in Spanish to be mailed by the clerk to every person named therein whose address is known. The court shall also cause a duly attested copy of the notice to be posted, in the Spanish language, in a conspicuous place on each parcel of land included in the application, and also in a conspicuous place upon the chief municipal building of the pueblo in which the land or a portion thereof is situate, by the governor or sheriff of the province or city, as the case may be, or by his deputy, fourteen days at least before the return day thereof, and his return shall be conclusive proof of such service. If the applicant requests to have the line of a public way determined, the court shall order a notice to be given by the clerk by mailing a registered letter to the president of the municipal council, or to the Municipal Board, as the case may be, of the municipality or city in which the land lies. If the land borders on a river, navigable stream, or shore, or on an arm of the sea where a river or harbor line has been established, or on a lake, or if it otherwise appears from the application or the proceedings that the Insular Government may have a claim adverse to that of the applicant, notice shall be given in the same manner to the Attorney-General. The court may also cause other or further notice of the application to be given in such manner and to such persons as it may deem proper. The court shall, so far as it deems it possible, require proof of actual notice to all adjoining owners and to all persons who appear to have interest in or claim to the land included in the application. Notice to such persons by mail shall be by registered letter if practicable. The certificate of the clerk that he has served the notice as directed by the court, by publishing or mailing, shall be filed in the case before the return day, and shall be conclusive proof of such service.

SEC. 33. Upon the return day of the notice, and proof of service of all orders of notice issued, the court may appoint a disinterested person to act as guardian *ad litem* for minors and persons *not in being*, unascertained, unknown, or out of the Philippine Islands, who may have an interest. The compensation of the guardian or agent shall be determined by the court and paid as part of the expenses of the court.

SEC. 34. Any person claiming an interest, whether named in the notice or not, may appear and file answer on or before the return day, or within such further time as may be allowed by the court. The answer shall state all the objections to the application, and shall set forth the interest claimed by the

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[a] NOTE:

[Act No. 1648.]

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SEC. 2. The publication in the Official Gazette of the notice provided for in section one of this Act shall be in lieu of the publication thereof in the newspapers as heretofore provided, and all Acts and parts of Acts in conflict with this Act are hereby repealed.

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party filing the same, and shall be signed and sworn to by him or by some person in his behalf.

SEC. 35. (*As amended by Act No. 1699.*) If no person appears and answers within the time allowed, the court may at once upon motion of the applicant, no reason to the contrary appearing, order a general default to be recorded and the application to be taken for confessed. By the description in the notice, 'To all whom it may concern,' all the world are made parties defendant and shall be concluded by the default and order. After such default and order the court may enter a decree confirming the title of the applicant and ordering registration of the same.

SEC. 36. (*As amended by Acts Nos. 1108 and 1699.*) If in any case an appearance is entered and answer filed, the case shall be set down for hearing on motion of either party, but a default and order shall be entered against all persons who do not appear and answer, in the manner provided in the preceding section. The court may hear the parties and their evidence or may refer the case or any part thereof to a referee, to hear the parties and their evidence and make report thereon to the court. The trial before the referee may occur at any convenient place within the province or city, and the time and place of trial shall be fixed by the referee and reasonable notice thereof shall be given by him to the parties. The court shall render judgment in accordance with the report as though the facts had been found by the judge himself, unless the court shall for cause shown set the report aside or order it to be recommitted to the referee for further finding: *Provided, nevertheless,* That the court may in its discretion accept the report in part or set it aside in part. The court may in any case before decree require a survey to be made for the purpose of determining boundaries, and may order durable bounds to be set, and referred to in the application, by amendment. The expense of survey and bounds shall be taxed in the costs of the case and may be apportioned among the parties as justice may require. If no person appears to oppose the application, such expense shall be borne by the applicant. If two or more applications claim the same land, or part of the same land, the court may order the hearings upon all such applications to be consolidated, if such consolidation is in the interest of economy of time and expense.

The surveying required by the provisions of this section, or by any rules and directions of the Court of Land Registration, and the drafting of any plans required, may be done by any private surveyor of sufficient qualifications, to be approved by the judges of the Court of Land Registration, or by a surveyor or surveyors to be detailed for that purpose from the clerical force authorized by law for the Court of Land Registration, whose duty it is hereby made to provide in its clerical force a sufficient number of competent surveyors for the purpose of carrying out the provisions of this section. The judges of the Court of Land Registration shall fix in each case the fee to be charged by the expense of a survey and necessary drafting, which shall be paid by the applicant, or apportioned among the parties, as justice may require. The fees so charged shall be paid into the Insular Treasury, except in cases where a private surveyor, to be approved by the judges, is employed.

SEC. 37. If in any case the court finds that the applicant has not proper title for registration, a decree shall be entered dismissing the application, and such decree may be ordered to be without prejudice. The applicant may withdraw his application at any time before final decree, upon terms to be fixed by the court.

SEC. 38. If the court after hearing finds that the applicant has title as stated in his application, and proper for registration, a decree of confirmation and registration shall be entered. Every decree of registration shall bind the land, and quiet title thereto, subject only to the exceptions stated in the following section. It shall be conclusive upon and against all persons, including the Insular Government and all the branches thereof, whether mentioned by name in the application, notice, or citation, or included in the general description "To all whom it may concern." Such decree shall not be opened by reason of the absence, infancy, or other disability of any person affected thereby, nor by any proceeding in any court for reversing judgments or decrees; subject, however, to the right of any person deprived of land or of any estate or interest therein by decree of registration obtained by fraud to file in the Court of Land Registration a petition for review within one year after entry of the decree, provided no innocent purchaser for value has acquired an interest. If there is any such purchaser, the decree of registration shall not be opened, but shall remain in full force and effect forever, subject only to the right of appeal here-

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inbefore provided. But any person aggrieved by such decree in any case may pursue his remedy by action for damages against the applicant or any other person for fraud in procuring the decree. Whenever the phrase "innocent purchaser for value" or an equivalent phrase occurs in this Act, it shall be deemed to include an innocent lessee, mortgagee, or other encumbrancer for value.

SEC. 39. Every applicant receiving a certificate of title in pursuance of a decree of registration, and every subsequent purchaser of registered land who takes a certificate of title for value in good faith, shall hold the same free of all incumbrance except those noted on said certificate, and any of the following incumbrances which may be subsisting, namely:

First. Liens, claims, or rights arising or existing under the laws or Constitution of the United States or of the Philippine Islands which the statutes of the Philippine Islands can not require to appear of record in the registry.

Second. Taxes within two years after the same have become due and payable.

Third. Any public highway, way, or private way established by law, where the certificate of title does not state that the boundaries of such highway or way have been determined. But if there are easements or other rights appurtenant to a parcel of registered land which for any reason have failed to be registered, such easements or rights shall remain so appurtenant notwithstanding such failure, and shall be held to pass with the land until cut off or extinguished by the registration of the servient estate, or in any other manner.

SEC. 40. Every decree of registration shall bear the day of the year, hour, and minute of its entry, and shall be signed by the clerk. It shall state whether the owner is married or unmarried, and if married, the name of the husband or wife. If the owner is under disability, it shall state the nature of the disability, and if a minor, shall state his age. It shall contain a description of the land as finally determined by the court, and shall set forth the estate of the owner, and also, in such manner as to show their relative priority, all particular estates, mortgages, easements, liens, attachments, and other incumbrances, including rights of husband or wife, if any, to which the land or owner's estate is subject, and may contain any other matter properly to be determined in pursuance of this Act. The decree shall be stated in a convenient form for transcription upon the certificates of title hereinafter mentioned.

SEC. 41. Immediately upon the entry of the decree of registration the clerk shall send a certified copy thereof, under the seal of the court, to the register of deeds for the province, or provinces, or city in which the land lies, and the register of deeds shall transcribe the decree in a book to be called the "Registration Book," in which a leaf, or leaves, in consecutive order shall be devoted exclusively to each title. The entry made by the register of deeds in this book in each case shall be the original certificate of title, and shall be signed by him and sealed with the seal of the court. All certificates of title shall be numbered consecutively, beginning with number one. The register of deeds shall in each case make an exact duplicate of the original certificate, including the seal, but putting on it the words "Owner's duplicate certificate," and deliver the same to the owner, or to his attorney duly authorized. In case of a variance between the owner's duplicate certificate and the original certificate the original shall prevail. The certified copy of the decree of registration shall be filed and numbered by the register of deeds with a reference noted on it to the place of record of the original certificate of title: *Provided, however*, That when an application includes land lying in more than one province, or one province and the city of Manila, the court shall cause the part lying in each province or in the city of Manila to be described separately by metes and bounds in the decree of registration, and the clerk shall send to the register of deeds for each province, or the city of Manila, as the case may be, a copy of the decree containing a description of the land within that province or city. and the register of deeds shall register the same and issue an owner's duplicate therefor, and thereafter for all matters pertaining to registration under this Act the portion in each province or city shall be treated as a separate parcel of land.

SEC. 42. The certificate first registered in pursuance of the decree of registration in regard to any parcel of land shall be entitled in the registration book, "Original certificate of title, entered pursuant to decree of the Court of Land Registration, dated at" (stating time and place of entry of decree and the number of case). This certificate shall take effect upon the date of the

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transcription of the decree. Subsequent certificates relating to the same land shall be in like form, but shall be entitled "Transfer from number" (the number of the next previous certificate relating to the same land), and also the words "Originally registered" (date, volume, and page of registration).

SEC. 43. Where two or more persons are registered owners, as tenants in common, or otherwise, one owner's duplicate certificate may be issued for the whole land, or a separate duplicate may be issued to each for his undivided share.

SEC. 44. A registered owner holding one duplicate certificate for several distinct parcels of land may surrender it, with the approval of the court, and take out several certificates for portions thereof. So a registered owner holding separate certificates for several distinct parcels may surrender them, and, with like approval, take out a single duplicate certificate for the whole land, or several certificates for the different portions thereof. Any owner subdividing a tract of registered land into lots shall file with the clerk a plan of such land, when applying for a new certificate or certificates, and the court, before issuing the same shall cause the plan to be verified and require that all boundaries, streets, and passageways shall be distinctly and accurately delineated thereon.

SEC. 45. The obtaining of a decree of registration and the entry of a certificate of title shall be regarded as an agreement running with the land, and binding upon the applicant and all successors in title that the land shall be and always remain registered land, and subject to the provisions of this Act and all Acts amendatory thereof.

SEC. 46. No title to registered land in derogation to that of the registered owner shall be acquired by prescription or adverse possession.

SEC. 47. The original certificate in the registration book, any copy thereof duly certified under the signature of the clerk, or of the register of deeds of the province or city where the land is situate, and the seal of the court, and also the owner's duplicate certificate, shall be received as evidence in all the courts of the Philippine Islands and shall be conclusive as to all matters contained therein except so far as otherwise provided in this Act.

SEC. 48. Every certificate of title shall set forth the names of all the persons interested in the estate in fee simple in the whole land and duplicate certificates may be issued to each person, but the clerk or register of deeds, as the case may be, shall note in the registration book, and upon each certificate, to whom such duplicate was issued.

SEC. 49. The clerk, under direction of the court, shall make and keep indexes of all applications, of all decrees of registration, and shall also index and classify all papers and instruments filed in his office relating to applications and to registered titles. He shall also, under direction of the court, cause forms of index and registration and entry books to be prepared for use of the registers of deeds. The court shall prepare and adopt convenient forms of certificates of title, and shall also adopt general forms of memoranda to be used by registers of deeds in registering common forms of deeds of conveyance and other instruments, and to express briefly their effect.

VOLUNTARY DEALING WITH LAND AFTER ORIGINAL REGISTRATION.

SEC. 50. An owner of registered land may convey, mortgage, lease, charge, or otherwise deal with the same as fully as if it had not been registered. He may use forms of deeds, mortgages, leases, or other voluntary instruments like those now in use and sufficient in law for the purpose intended. But no deed, mortgage, lease, or other voluntary instrument, except a will, purporting to convey or affect registered land, shall take effect as a conveyance or bind the land, but shall operate only as a contract between the parties and as evidence of authority to the clerk or register of deeds to make registration. The act of registration shall be the operative act to convey and affect the land, and in all cases under this Act the registration shall be made in the office of register of deeds for the province or provinces or city where the land lies.

SEC. 51. Every conveyance, mortgage, lease, lien, attachment, order, decree, instrument, or entry affecting registered land which would under existing laws, if recorded, filed, or entered in the office of the register of deeds, affect the real estate to which it relates shall, if registered, filed, or entered in the office of the register of deeds in the province or city where the real estate to which such instrument relates lies, be notice to all persons from the time of such registering, filing, or entering.

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SEC. 52. No new certificate shall be entered or issued upon any transfer of registered land which does not divest the land in fee simple from the owner or from some one of the registered owners. All interests in registered land less than an estate in fee simple shall be registered by filing with the register of deeds the instrument creating or transferring or claiming such interest and by a brief memorandum thereof made by the register of deeds upon the certificate of title, signed by him. A similar memorandum shall also be made on the owner's duplicate. The cancellation or extinguishment of such interests shall be registered in the same manner.

SEC. 53. Where the register of deeds is in doubt upon any question of law, or where any party in interest does not agree as to the proper memorandum to be made in pursuance of any deed, mortgage, or other voluntary instrument presented for registration, the question shall be referred to the court for decision, either on the certificate of the register of deeds stating the question upon which he is in doubt or upon the suggestion in writing of any party in interest; and the court, after notice to all parties and hearing, shall enter an order prescribing the form of memorandum to the register of deeds to make registration in accordance therewith.

SEC. 54. Every deed or other voluntary instrument presented for registration shall contain or have indorsed upon it the full name, place of residence, and post-office address of the grantee or other person acquiring or claiming such interest under such instrument, and every such instrument shall also state whether the grantee is married or unmarried, and, if married, give the name in full of the husband or wife. Any change in the residence or post-office address of such person shall be indorsed by the register of deeds on the original instrument, on receiving a sworn statement of such change. All names and addresses shall also be entered upon all certificates. Notices and process in relation to registered land in pursuance of this Act may be served upon any person in interest by mailing the same to the address so given, and shall be binding whether such person resides within or without the Philippine Islands, but the court may, in its discretion, require further or other notice to be given in any case, if in its opinion the interests of justice so require.

SEC. 55. No new certificate of title shall be entered, no memorandum shall be made upon any certificate of title by the clerk, or by any register of deeds, in pursuance of any deed or other voluntary instrument, unless the owner's duplicate certificate is presented for such indorsement, except in cases expressly provided for in this Act, or upon the order of the court, for cause shown; and whenever such order is made a memorandum thereof shall be entered upon the new certificate of title and upon the owner's duplicate.

The production of the owner's duplicate certificate whenever any voluntary instrument is presented for registration shall be conclusive authority from the registered owner to the clerk or register of deeds to enter a new certificate or to make a memorandum of registration in accordance with such instrument, and the new certificate or memorandum shall be binding upon the registered owner and upon all persons claiming under him, in favor of every purchaser for value and in good faith: *Provided, however*, That in all cases of registration procured by fraud the owner may pursue all his legal and equitable remedies against the parties to such fraud, without prejudice, however, to the rights of any innocent holder for value of a certificate of title: *And provided further*, That after the transcription of the decree of registration on the original application, any subsequent registration under this Act procured by the presentation of a forged duplicate certificate, or of a forged deed or other instrument, shall be null and void. In case of the loss or theft of an owner's duplicate certificate, noticee shall be sent by the owner or by some one in his behalf to the register of deeds of the province in which the land lies, as soon as the loss or theft is discovered.

SEC. 56. Each register of deeds shall keep an entry book in which he shall enter in the order of their reception all deeds and other voluntary instruments, and all copies of writs or other process filed with him relating to registered land. He shall note in such book the year, month, day, hour, and minute of reception of all instruments, in the order in which they are received. They shall be regarded as registered from the time so noted, and the memorandum of each instrument when made on the certificate of title to which it refers shall bear the same date.

Every deed or other instrument, whether voluntary or involuntary, so filed with the clerk or register of deeds shall be numbered and indexed, and indorsed

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with a reference to the proper certificate of title. All records and papers relating to registered land in the office of the clerk or of any register of deeds shall be open to the public, subject to such reasonable regulations as the clerk, under the direction of the court, may make.

Duplicates of all deeds and voluntary instruments filed and registered may be presented with the originals, and shall be attested and sealed by the clerk or the register of deeds, and indorsed with the file number and other memoranda on the originals, and may be taken away by the person presenting the same.

Certified copies of all instruments filed and registered may also be obtained at any time, upon the payment of the fees of the register of deeds.

CONVEYANCE IN FEE.

SEC. 57. An owner desiring to convey in fee his registered land or any portion thereof shall execute a deed of conveyance, which the grantor or grantee may present to the register of deeds in the province where the land lies. The grantor's duplicate certificate shall be produced and presented at the same time. The register of deeds shall thereupon, in accordance with the rules and instructions of the court, make out in the registration book a new certificate of title to the grantee, and shall prepare and deliver to him an owner's duplicate certificate. The register of deeds shall note upon the original and duplicate certificates the date of transfer, the volume and page of the registration book where the new certificate is registered, and a reference by number to the last prior certificate. The grantor's duplicate certificate shall be surrendered, and the word "canceled" stamped upon it. The original certificate shall also be stamped "canceled." The deed of conveyance shall be filed and indorsed with the number and place of registration of the certificate of title of the land conveyed.

SEC. 58. When a deed in fee is for a part only of the land described in a certificate of title, the register of deeds shall also enter a new certificate and issue an owner's duplicate to the grantor for the part of the land not included in the deed. In every case of transfer the new certificate or certificates shall include all the land described in the original and surrendered certificates: *Provided, however*, That no new certificate to a grantee of a part only of the land shall be invalid by reason of the failure of the register of deeds to enter a new certificate to the grantor for the remaining unconveyed portion: *And provided further*, That in case the land described in a certificate of title is divided into lots, designated by numbers or letters, with measurements of all the bounds, and a plan of said land has been filed with the clerk and verified pursuant to section forty-four of this Act, and a certified copy thereof is recorded in the registration book with the original certificate, when the original owner makes a deed of transfer in fee of one or more of such lots, the register of deeds may, instead of canceling such certificate and entering a new certificate to the grantor for the part of the land not included in the deed of transfer, enter on the original certificate and on the owner's duplicate certificate a memorandum of such deed of transfer, with a reference to the lot or lots thereby conveyed as designated on such plan, and that the certificate is canceled as to such lot or lots; and every certificate with such memorandum shall be effectual for the purpose of showing the grantor's title to the remainder of the land not conveyed as if the old certificate had been canceled and a new certificate of such land had been entered; and such process may be repeated so long as there is convenient space upon the original certificate and the owner's duplicate certificate for making such memorandum of sale of lots.

SEC. 59. If at the time of any transfer there appear upon the registration book incumbrances or claims adverse to the title of the registered owner, they shall be stated in the new certificate or certificates, except so far as they may be simultaneously released or discharged.

MORTGAGES.

SEC. 60. The owner of registered land may mortgage the same by executing a mortgage deed, and such deed may be assigned, extended, discharged, released in whole or in part, or otherwise dealt with by the mortgagee by any form of deed or instrument sufficient in law for the purpose. But such mortgage deed, and all instruments assigning, extending, discharging, and otherwise dealing with the mortgage, shall be registered, and shall take effect upon the title only from the time of registration.

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SEC. 61. Registration of a mortgage shall be made in the manner following, to wit: The owner's duplicate certificate shall be presented to the register of deeds with the mortgage deed, and he shall enter upon the original certificate of title and also upon the owner's duplicate certificate a memorandum of the purport of the mortgage deed, the time of filing and the file number of the deed, and shall sign the memorandum. He shall also note upon the mortgage deed the time of filing and a reference to the volume and page of the registration book where it is registered.

The register of deeds shall also, at the request of the mortgagee, make out and deliver to him a duplicate of the certificate of title, like the owner's duplicate, except that the words "mortgagee's duplicate" shall be stamped upon it in large letters diagonally across its face. A memorandum of the issue of the mortgagee's duplicate shall be made upon the original certificate of title.

SEC. 62. Whenever a mortgage upon which a mortgagee's duplicate has been issued is assigned, extended, or otherwise dealt with, the mortgagee's duplicate shall be presented with the instrument assigning, extending, or otherwise dealing with the mortgage, and a memorandum of the instrument shall be made upon the mortgagee's duplicate certificate. When the mortgage is discharged or otherwise extinguished the mortgagee's duplicate certificate shall be surrendered and stamped "canceled." The production of the mortgagee's duplicate certificate shall be conclusive authority to register the instrument therewith presented, subject, however, to all the provisions and exceptions contained in section fifty-five of this Act so far as the same are applicable.

A mortgage on registered land may also be discharged, by the mortgagee in person, on the registration book, by indorsing upon the original certificate of title and upon the owner's duplicate certificate a memorandum stating that the mortgage has been satisfied and is discharged, together with the date of such entry, signed by the mortgagee, and such discharge shall be attested by the register of deeds, the mortgagee's duplicate certificate being at the same time surrendered and stamped "canceled."

SEC. 63. Mortgages of registered land may be foreclosed in the manner provided in the Code of Procedure in Civil Actions and Special Proceedings.[a] A certified copy of the final decree of the court confirming the sale under foreclosure proceedings may be filed with the register of deeds after the time for appealing therefrom has expired, and the purchaser shall thereupon be entitled to the entry of a new certificate and to the issuance of a new owner's duplicate certificate, a memorandum thereof being at the same time likewise indorsed upon the mortgagor's original certificate and the mortgagee's duplicate, if any, being first delivered up and canceled: *Provided, however*, That nothing contained in this Act shall be construed to prevent the mortgagor or other person interested from directly impeaching by any proper legal proceedings any foreclosure proceedings affecting registered land, prior to the entry of a new certificate of title.

LEASES.

SEC. 64. Leases of registered land shall be registered in the manner provided in section fifty-two of this Act, in lieu of recording. A lessee's duplicate certificate may be issued to the lessee upon his request, subject to the provisions hereinbefore made in regard to a mortgagee's duplicate certificate, so far as the same are applicable.

TRUSTS.

SEC. 65. Whenever a deed or other instrument is filed for the purpose of transferring registered land in trust, or upon any equitable condition or limitation expressed therein, or for the purpose of creating or declaring a trust or other equitable interest in such land without transfer, the particulars of the trust, condition, limitation, or other equitable interest shall not be entered on the certificate; but a memorandum thereof shall be entered by the words "in trust," or "upon condition," or other apt words, and by a reference by number to the instrument authorizing or creating the same. A similar memorandum shall be made upon the duplicate certificate. The register of deeds shall note upon the original instrument creating or declaring the trust or other equitable interest a reference by number to the certificate of title to which it relates, and to the volume and page in the registration book where it is registered. If the instrument creating or declaring a trust or other equitable interest is already recorded in the land register of the Philippine Islands, a certified copy may be filed by the register of deeds and registered.

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[a] See page 548.

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SEC. 66. If the instrument creating or declaring a trust or other equitable interest contains an express power to sell, mortgage, or deal with the land in any manner, such power shall be stated in the certificate of title by the words "with power to sell," or "with power to mortgage," and by apt words of description in case of other powers. No instrument transferring, mortgaging, or in any way dealing with registered land held in trust shall be registered, unless the power thereto enabling is expressly conferred in the instrument of trust, or unless the decree of à court of competent jurisdiction has construed the instrument in favor of such power, in which case a certified copy of such decree may be filed with the register of deeds, and he shall make registration in accordance therewith.

SEC. 67. When a new trustee of registered land is appointed by a court of competent jurisdiction, a new certificate shall be entered to him upon presentation to the register of deeds of a certified copy of the decree and the surrender and cancellation of the duplicate certificate.

SEC. 68. Whoever claims an interest in registered land by reason of any implied or constructive trust shall file for registration a statement thereof with the register of deeds. The statement shall contain a description of the land, and a reference to the number of the certificate of title and the volume and page of the registration book where it is entered. Such claim shall not affect the title of a purchaser for value and in good faith before its registration.

SEC. 69. Any trustee shall have authority to file an application for registration of any land held in trust by him, unless expressly prohibited by the instrument creating the trust.

LEGAL INCIDENTS OF REGISTERED LAND.

SEC. 70. Registered land, and ownership therein, shall in all respects be subject to the same burdens and incidents attached by law to unregisterd land. Nothing contained in this Act shall in any way be construed to relieve registered land or the owners thereof from any rights incident to the relation of husband and wife, or from liability to attachment on mesne process or levy on execution, or from liability to any lien of any description established by law on land and the buildings thereon, or the interest of the owner in such land or buildings, or to change the laws of descent, or the rights of partition between coparceners, joint tenants and other cotenants, or the right to take the same by eminent domain, or to relieve such land from liability to be appropriated in any lawful manner for the payment of debts, or to change or affect in any other way any other rights or liabilities created by law and applicable to unregistered land, except as otherwise expressly provided in this Act or in the amendments hereof.

ATTACHMENTS AND OTHER LIENS.

SEC. 71. In every case where a writing of any description or a copy of any writ is required by law to be filed or recorded in the registry of deeds in order to create or preserve any lein, right, or attachment upon unregistered land, such writing or copy when intended to affect registered land, in lieu of recording, shall be filed and registered in the office of the register of deeds for the province in which the land lies, and, in addition to any particulars required in such papers for recording with records of deeds, shall also contain a reference to the number of the certificate of title of the land to be affected, and the volume and page in the registration book where the certificate is registered, and also, if the attachment, right, or lien is not claimed on all the land in any certificate of title, a description sufficiently accurate for identification, of the land intended to be affected.

SEC. 72. In every case where an attachment or other lien or adverse claim of any description is registered, and the duplicate certificate is not presented at the time of registration to the register of deeds, he shall within twenty-four hours thereafter send notice by mail to the registered owner, stating that such paper has been registered, and requesting him to send or produce the duplicate certificate in order that a memorandum of the attachment or other lien or adverse claim shall be made thereon. If the owner neglects or refuses to comply within a reasonable time, the register of deeds shall suggest the fact to the court, and the court, after notice, shall enter an order to the owner to produce his certificate at a time and place to be named therein, and may enforce the order by suitable process.

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SEC. 73. Attachment on mesne process and liens of every description upon registered land shall be continued, reduced, discharged, and dissolved by any method sufficient in law to continue, reduce, discharge, or dissolve like liens on unregistered land. All certificates or other instruments which are permitted or required by law to be recorded in the registry of deeds to give effect to the continuance, reduction, discharge, or dissolution of attachments or other liens on unregistered lands, or to give notice of such continuance, reduction, discharge, or dissolution, shall in the case of like liens on registered land be filed with the register of deeds and registered in the registration book, in lieu of recording.

SEC. 74. All the provisions of law now in force relating to attachments of real estate and leasehold estates on mesne process shall apply to registered land, except that the duties required to be performed by the present recording officer shall be performed by the register of deeds for the province where the land lies, who, in lieu of recording, shall register the facts heretofore required to be recorded, and for that purpose shall keep suitable books.

SEC. 75. The name and address of the plaintiff's lawyer shall in all cases be indorsed on the writ or process where an attachment is made, and he shall be deemed to be the attorney of the plaintiff until written notice that he has ceased to be such shall be filed for registration by the plaintiff.

SEC. 76. Whenever an attachment on mesne process is continued, reduced, dissolved, or otherwise affected by an order, decision, or judgment of the court in which the action or proceeding in which said attachment was made is pending, or by the order of any judge or court having jurisdiction thereof, a certificate of the entry of such order, decision, or judgment from the clerk of the court or judge by which such order, decision, or judgment has been rendered and under the seal of the court or judge, shall be entitled to be registered on presentation to the register of deeds.

SEC. 77. A lien of any description on registered land shall be enforced in the same manner as like liens upon unregistered land. Whenever registered land is sold on execution, or taken or sold for taxes or for any assessment, or to enforce a lien of any character, or for any costs and charges incident to such liens, any execution, or copy of execution, any officer's return, or any deed, demand, certificate, or affidavit, or other instrument made in the course of proceedings to enforce such liens and required by law to be recorded in the registry of deeds in the case of unregistered land, shall be filed with the register of deeds for the province where the land lies and registered in the registration book, and a memorandum made upon the proper certificate of title, in each case, as an adverse claim or incumbrance.

SEC. 78. Upon the expiration of the time, if any, allowed by law for redemption after registered land has been sold on any execution, or taken or sold for the enforcement of any lien of any description, the person claiming under the execution or under any deed or other instrument made in the course of proceedings to levy such execution or enforce any lien, may petition the court for the entry of a new certificate to him, and the application may be granted: *Provided, however*, That every new certificate entered under this section shall contain a memorandum of the nature of the proceeding on which it is based: *Provided further*, That at any time prior to the entry of a new certificate the registered owner may pursue all his lawful remedies to impeach or annul proceedings under executions or to enforce liens of any description.

PENDING SUITS, JUDGMENTS, DECREES, AND PARTITIONS.

SEC. 79. No action to recover possession of real estate, or to quiet the title thereto, or to remove clouds upon the title thereof, or for partition or other proceeding of any kind in court affecting the title to real estate or the use and occupation thereof or the buildings thereon, and no judgment or decree, and no proceeding to vacate or reverse any judgment or decree, shall have any effect upon registered land as against persons other than the parties thereto, unless a memorandum stating the institution of such action or proceeding and the court wherein the same is pending, and the date of the institution thereof, containing also a reference to the number of the certificate of title of the land affected, and the volume and page of the registration book where it is entered, shall be filed and registered. This section shall not apply to attachments, levies of execution, or to proceedings for the probate of wills, or for administration of the estates of deceased persons in the Court of First Instance: *Provided, however*, That in case notice of the pendency of the action has been duly regis-

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tered it shall be sufficient to register the judgment or decree in such action within sixty days after the rendition thereof.

SEC. 80. At any time after final judgment or decree in favor of the defendant, or other disposition of the action such as to terminate finally all rights of the plaintiff in and to the land and buildings involved, in any case in which a memorandum has been registered as provided in the preceding section, a certificate of the clerk of the court in which the action or proceeding was pending stating the manner of disposal thereof shall be entitled to registration.

SEC. 81. Whenever in any action to recover the possession or ownership of real estate or any interest therein affecting registered land judgment is entered for the plaintiff, such judgment shall be entitled to registration on presentation of a certificate of the entry thereof from the clerk of the court where the action is pending to the register of deeds for the province where the land lies, who shall enter a memorandum upon the certificate of title of the land to which such judgment relates. If the judgment does not apply to all the land described in the certificate of title, the certificate of the clerk of the court where the action is pending and the memorandum entered by the register of deeds shall contain a description of the land affected by the judgment.

SEC. 82. When in any action to recover the possession or title of real estate or an interest therein execution has been issued directing the officer to place the plaintiff in possession of the land affected by the judgment on which the execution was issued, the officer shall cause an attested copy of the execution, with a return of his doings thereon, to be filed and registered within three months after the service, and before the return of the execution into the office of the clerk whence it issued, and the plaintiff, in case the judgment was that he was entitled to an estate in fee simple in the demanded premises or in any part thereof, and for which execution issued, shall thereupon be entitled to the entry of a new certificate of title and to a cancellation of the certificate and owner's duplicate certificate of the former registered owner. If the former registered owner neglects or refuses within a reasonable time after request to produce his duplicate certificate in order that the same may be canceled, the court on application and after notice shall enter an order to the owner to produce his certificate at the time and place named therein, and may enforce the order by suitable process.

SEC. 83. Every court passing a judgment or decree in favor of the plaintiff affecting registered land shall, upon application of the plaintiff, order any parties before it to execute for registration any deed or instrument necessary to give effect to its judgment or decree, and may require the registered owner to deliver his duplicate certificate to the plaintiff to be canceled or to have a memorandum entered upon it by the register of deeds. In case the person required to execute any deed or other instrument necessary to give effect to the judgment or decree is absent from the Philippine Islands, or is a minor, or insane, or for any reason not amenable to the process of the court, the court passing the judgment or decree may appoint some suitable person a trustee to execute such instrument, and the same when executed shall be registered and shall have full force and effect to bind the land to be affected thereby.

SEC. 84. In all proceedings for partition of registered land, after the entry of the final judgment or decree of partition and the filing of the report of the committee or commissioners and final judgment thereon, a copy of the final judgment or decree, certified by the clerk of the court rendering the same, shall be filed and registered; and thereupon, in case the land is set off to the owners in severalty, any owner shall be entitled to have his certificate entered to the share set off to him in severalty, and to receive an owner's duplicate thereof. In case the land is ordered by the court to be sold, the purchaser or his assigns shall be entitled to have a certificate of title entered to him or to them on presenting the deed of the commissioners or committee for registration. In case the land is ordered by the court rendering the judgment to be set off in entirety to one of the parties upon payment to the other parties to the action, the party to whom the land is thus ordered to be set off shall be entitled to have a certificate of title entered to him on presenting a copy of the judgment or decree certified by the clerk of the court rendering the same: *Provided, however,* That any new certificate entered in pursuance of partition proceedings, whether by way of set-off or of assignment or of sale, shall contain a reference to the final judgment or decree or partition, and shall be conclusive as to the title to the same extent against the same person as such judgment or decree is made conclusive by the laws applicable thereto: *And provided, also,* That any person holding such certificates of title or transfer

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thereof shall have the right to petition the court at any time to cancel the memorandum relating to such judgment or decree, and the court, after notice and hearing, may grant the application. Such certificate shall thereafter be conclusive in the same manner and in the same extent as other certificates of title.

SEC. 85. When a certified copy of a judgment or decree making final partition of land or buildings is presented for registration, if a mortgage or lease affecting a specific portion or an undivided share of the premises had previously been registered, the mortgagee, or tenant claiming under the mortgagor or lessor, shall cause the mortgage or lease and any duplicate certificate of title issued to the mortgagee or lessee to be again presented for registration, and the register of deeds shall indorse on each the memorandum of such partition, with a description of the land set off in severalty on which such mortgage or lease remains in force. Such mortgagee or tenant shall not be entitled to receive his own duplicate certificate of title until such mortgage or lease has been so presented for registration.

BANKRUPTCY, INSOLVENCY, AND ANALOGOUS PROCEEDINGS.

SEC. 86. Whenever proceedings in bankruptcy or insolvency, or analogous proceedings are instituted against a debtor who is an owner of registered land, it shall be the duty of the officer serving the notice of the institution of such proceedings on the debtor to file a copy thereof in the registry of deeds for the province wherein land of the debtor lies. The assignee or trustee appointed by the court having jurisdiction thereof in such proceedings shall be entitled to the entry of a new certificate of registered land of the debtor upon presenting and filing a certified copy of the order appointing him such assignee or trustee, with the debtor's duplicate certificate of title; the new certificate shall state that it is entered to him as assignee or trustee in insolvency or bankruptcy or other proceedings, as the case may be.

SEC. 87. Whenever proceedings of the character named in the preceding section against a registered owner, of which notice has been registered, are vacated by decree or judgment, a certified copy of the decree or judgment may be filed and registered. If a new certificate has been entered to the assignee or trustee as registered owner, the debtor shall be entitled to the entry of a new certificate to him, and the certificate of the assignee or trustee shall be surrendered.

EMINENT DOMAIN.[a]

SEC. 88. Whenever any land of a registered owner, or any right or interest therein, is taken by eminent domain, the Government or municipality or corporation or other authority exercising such right shall file for registration in the proper province a description of the registered land so taken, giving the name of each owner thereof, referring by number and place of registration in the registration book to each certificate of title, and stating what amount or interest in the land is taken, and for what purpose. A memorandum of the right or interest taken shall be made on each certificate of title by the register of deeds, and where the fee simple is taken a new certificate shall be entered to the owner for the land remaining to him after such taking, and a new certificate shall be entered to the Government, municipality, corporation, or other authority exercising such right for the land so taken. All fees on account of any memorandum of registration or entry of new certificates shall be paid by the authority taking the land.

TRANSMISSION BY DESCENT AND DEVISE.

SEC. 89. Lands and any estate or interest therein registered under this Act shall, upon the death of the owner, go to the executor or administrator of the deceased in like manner as personal estate, whether the owner dies testate or intestate, and shall be subject to the same rules of administration as if the same were personalty, except as otherwise provided in this Act, and except that the rule of division shall be the same as in the descent of real property, or as shall be provided by will.

SEC. 90. Before the executor or administrator of a deceased owner of registered land or any estate, or interest therein, shall deal with the same, he shall file in the office of the register of deeds a certified copy of his letters of administration, or if there is a will, a certified copy of the same and of the letters testamentary, or of administration, with the will annexed, as the case may be,

[a] See page 543.

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and shall produce the duplicate certificate of title, and thereupon the register of deeds shall enter upon the certificate and the duplicate certificate a memorandum thereof with a reference to the letters or will and letters by their file number, and the date of filing the same.

SEC. 91. Except in case of a will devising the land to an executor to his own use or upon some trust or giving to the executor power to sell, no sale or transfer of registered land shall be made by an executor or by an administrator in the course of administration for the payment of debts or for any other purpose, except in pursuance of an order of a court of competent jurisdiction obtained as provided by law.

SEC. 92. But after a memorandum of the will, letters testamentary, or letters of administration have been entered upon the register as hereinbefore provided, the executor or administrator may deal with mortgages, leases, and other personal interests in or upon registered land as if he were the registered owner thereof.

SEC. 93. Where it appears by the will, a certified copy of which with letters testamentary is filed as provided in this Act, that registered land is devised to the executor to his own use, or upon some trust, the executor may have the land transferred to himself upon the register in like manner and subject to like terms and conditions and to like rights as in the case of a transfer pursuant to deed filed in the office of the register of deeds.

SEC. 94. When the will of a deceased owner of registered land, or any estate or interest therein, empowers the executor to sell, convey, encumber, charge, or otherwise deal with the land, it shall not be necessary for such executor to be registered as the owner, but a certified copy of the will and letters testamentary being filed as provided in this Act, such executor may sell, convey, encumber, charge, or otherwise deal with the land pursuant to the power in like manner as if he were the registered owner, subject to the like conditions as to the trust, limitations, and conditions expressed in the will as in case of trusts, limitations, and conditions expressed in a deed.

SEC. 95. Before making distribution of undevised registered lands the executor or administrator shall file in the office of the register of deeds a certified copy of the final decree of the court having jurisdiction of the estate, which shall be conclusive evidence in favor of all persons thereafter dealing with the land that the persons therein named as the only heirs at law of the deceased are such heirs.

SEC. 96. Whenever the court having jurisdiction of the settlement of an estate shall, for the purpose of distribution thereof or for other purposes provided by law, order registered land or any interest or estate therein to be sold by the executor or administrator, upon the filing of a certified copy of the order of sale and the deeds executed in pursuance of the same in the office of the register of deeds, a transfer of the land, estate, or interest to the purchaser may be made upon the register as in the case of other sales by deed, and the original certificate and owner's duplicate shall be canceled and a new certificate and owner's duplicate be issued to the purchaser.

SEC. 97. Whenever, after the final determination of the amount of all claims against the estate of the deceased, it shall be made to appear to the court having jurisdiction of the estate that the estate will justify it and the proof of heirship has been made clear to that court, may direct the executor or administrator to make over and transfer to the devisees or heirs, or some of them, in anticipation of final distribution, a portion or the whole of the registered lands to which they might be entitled on final distribution; and upon the filing of a certified copy of such order in the office of the register of deeds, the executor or administrator may cause such transfer to be made upon the register in like manner as in case of a sale, and a certificate and owner's duplicate certificate shall be issued to the devisees or heirs entitled thereto as in other cases. The land so transferred shall be held free from all liens or claims against the estate. In the proceedings to procure such order or directions such notice shall be given to all parties in interest as the court having jurisdiction of the estate may direct.

SEC. 98. For the purpose of final distribution of the estate the court having jurisdiction thereof may determine the rights of all persons in registered land, or any estate or interest therein, of the deceased, declare and enforce the rights of devisees, heirs, surviving husbands or wives, and others, and make partition and distribution according to the rights of the parties, and may give direction to the executor and administrator as to the transfer of registered lands and any estate or interest therein to the devisees or heirs, and may

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direct the transfer to be to the several devisees or heirs or tenants in common, or otherwise, as shall appear to the court to be most convenient, consistently with the rights of the parties, or as the parties inerested may agree. A certified copy of the final order, judgment, or decree of the court having jurisdiction of the estate making final distribution shall be filed with the register of deeds and thereupon new certificates and owner's duplicate certificates shall be issued to the parties severally entitled thereto in accordance with such order, judgment, or decree, but nothing in this section contained shall in any way affect or impair existing requirements of law as to notice to be given to all parties interested in the estate of a deceased person before final decree of distribution thereof.

ASSURANCE FUND.

SEC. 99. (*As amended by Act No. 1108.*) Upon the original registration of land under this Act, and also upon the entry of a certificate showing title as registered owners in heirs or devisees, there shall be paid to the register of deeds one-tenth of one per cent of the assessed value of the real estate on the basis of the last assessment for municipal taxation, as an assurance fund.

In case land is subdivided subsequent to the last assessment and registration proceedings are had as to a portion only of such land, the value of such portion, for the purposes of this section, and for the payment required by paragraph four of section one hundred and fourteen, shall be fixed by agreement between the applicant and the tax collector of the city or province where the land is situated and shall be proportioned to the value such land bears to the whole tract assessed. In case of disagreement between the tax collector and the applicant as to the value of the land, the question shall be submitted to the court for decision.

Where land sought to be registered has not been assessed for taxation, its value, for the purposes of this Act, shall be its market value, and the applicant shall file with his application the sworn declaration of three disinterested persons that the value fixed by him is to their knowledge a fair valuation.

The court is authorized to increase the valuation as fixed under the two preceding paragraphs should it appear upon the hearing that the value stated in the application is too small.

SEC. 100. All money received by the register of deeds under the preceding section shall be paid to the Treasurer of the Philippine Archipelago. He shall keep the same invested, with the advice and approval of the Civil Governor, and shall report annually to the legislative body of the Philippine Islands the condition and income thereof.

SEC. 101. Any person who without negligence on his part sustains loss or damage through any omission, mistake, or misfeasance of the clerk, or register of deeds, or of any examiner of titles, or of any deputy or clerk of the register of deeds in the performance of their respective duties under the provisions of this Act, and any person who is wrongfully deprived of any land or any interest therein, without negligence on his part, through the bringing of the same under the provisions of this Act or by the registration of any other person as owner of such land, or by any mistake, omission, or misdescription in any certificate or owner's duplicate, or in any entry or memorandum in the register or other official book, or by any cancellation, and who by the provisions of this Act is barred or in any way precluded from bringing an action for the recovery of such land or interest therein, or claim upon the same, may bring in any court of competent jurisdiction an action against the Treasurer of the Philippine Archipelago for the recovery of damages to be paid out of the assurance fund.

SEC. 102. If such action be for recovery for loss or damage arising only through any omission, mistake, or misfeasance of the clerk, or of the register of deeds, or of any examiner of titles, or of any deputy or clerk of the register of deeds in the performance of their respective duties under the provisions of this Act, then the Treasurer of the Philippine Archipelago shall be the sole defendant to such action. But if such action be brought for loss or damage arising only through the fraud or willful act of some person or persons other than the clerk, the register of deeds, the examiners of titles, deputies, and clerks, or arising jointly through the fraud or wrongful act of such other person or persons and the omission, mistake, or misfeasance of the clerk, the register of deeds, the examiners of titles, deputies, or clerks, then such action shall be brought against both the Treasurer of the Philippine Archipelago and

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such person or persons aforesaid. In all such actions where there are defendants other than the Treasurer of the Philippine Archipelago and damages shall have been recovered, no final judgment shall be entered against the Treasurer of the Philippine Archipelago until execution against the other defendants shall be returned unsatisfied in whole or in part, and the officer returning the execution shall certify that the amount still due upon the execution can not be collected except by application to the assurance fund. Thereupon the court having jurisdiction of the action, being satisfied as to the truth of such return, may, upon proper showing, order the amount of the execution and costs, or so much thereof as remains unpaid, to be paid by the Treasurer of the Philippine Archipelago out of the assurance fund. It shall be the duty of the Attorney-General in person or by deputy to appear and defend all such suits with the aid of the fiscal of the province in which the land lies or the city attorney of the city of Manila as the case may be: *Provided, however,* That nothing in this Act shall be construed to deprive the plaintiff of any action which he may have against any person for such loss or damage or deprivation of land or of any estate or interest therein without joining the Treasurer of the Philippine Archipelago as a defendant therein.

SEC. 103. If the assurance fund at any time be not sufficient to meet the amount called for by such judgment, the Treasurer of the Philippine Archipelago shall make up the deficiency from any funds in the Treasury not otherwise appropriated; and in such case any sums thereafter received by the Treasurer on account of the assurance fund shall be transferred to the general fund of the Treasury, until the amount paid on account of the deficiency shall have been made up.

SEC. 104. In every case where payment has been made by the Treasurer of the Philippine Archipelago in accordance with the provisions of this Act, the Government of the Philippine Islands shall be subrogated to all rights of the plaintiff against any other parties or securities, and the Treasurer shall enforce the same in behalf of the Government. Any sum so recovered by the Treasurer shall be paid into the Treasury of the Philippine Islands to the account of the assurance fund.

SEC. 105. The income of the assurance fund shall be added to the principal and invested, until said fund amounts to the sum of two hundred thousand dollars, and thereafter the income of such fund shall be paid into the Insular Treasury for the general purposes of the Insular Government.

The term "dollars" wherever used in this Act shall be construed to mean money of the United States.

SEC. 106. The assurance fund shall not be liable to pay for any loss or damage or deprivation occasioned by a breach of trust, whether express, implied, or constructive, by any registered owner who is a trustee, or by the improper exercise of any sale in mortgage foreclosure proceedings. Nor shall any plaintiff recover as compensation in an action under this Act more than the fair market value of the real estate at the time when he suffered the loss, damage, or deprivation thereof.

SEC. 107. All actions for compensation under this Act by reason of any loss or damage or deprivation of land or any estate or interest therein shall be begun within the period of six years from the time when the right to bring or take such action or proceeding first accrued, and not afterwards: *Provided,* That the right of action herein provided shall survive to the personal representative of the person sustaining loss or damage, if deceased, unless barred in his lifetime: *And provided further,* That if at the time when such right of action first accrues the person entitled to bring such action or take such proceeding is within the age of majority, or insane, or imprisoned, such person, or anyone claiming from, by, or under him, may bring the action or take the proceeding at any time within two years after such disability is removed, notwithstanding the time before limited in that behalf has expired.

POWERS OF ATTORNEY.

SEC. 108. Any person may by power of attorney procure land to be registered and conveyed or otherwise deal with registered land, but the letters of attorney shall be acknowledged before a notary public or a judge or clerk of a court of record attested by at least one witness and shall be filed with the clerk or register of deeds of the province where the land lies, and registered. Any instrument revoking such letters shall be acknowledged, attested, and registered in like manner.

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LOST DUPLICATE CERTIFICATE.

SEC. 109. If a duplicate certificate is lost or destroyed, or can not be produced by a grantee, heir, devisee, assignee, or other person applying for the entry of a new certificate to him or for the registration of any instrument, a suggestion of the fact of such loss or destruction may be filed by the registered owner or other person in interest, and registered. The court may thereupon, upon the petition of the registered owner or other person in interest, after notice and hearing, direct the issue of a new duplicate certificate, which shall contain a memorandum of the fact that it is issued in place of the lost duplicate certificate, but shall in all respects be entitled to like faith and credit as the original duplicate and shall thereafter be regarded as the original duplicate for all purposes of this Act.

ADVERSE CLAIMS.

SEC. 110. Whoever claims any right or interest in registered land adverse to the registered owner, arising subsequent to the date of the original registration, may, if no other provision is made in this Act for registering the same, make a statement in writing setting forth fully his alleged right or interest, and how or under whom acquired, and a reference to the volume and page of the certificate of title of the registered owner, and a description of the land in which the right or interest is claimed. The statement shall be signed and sworn to, and shall state the adverse claimant's residence, and designate a place at which all notices may be served upon him. This statement shall be entitled to registration as an adverse claim, and the court, upon a petition of any party in interest, shall grant a speedy hearing upon the question of the validity of such adverse claim and shall enter such decree therein as justice and equity may require. If the claim is adjudged to be invalid, the registration shall be canceled. If in any case the court after notice and hearing shall find that a claim thus registered was frivolous or vexatious, it may tax the adverse claimant double or treble costs in its discretion.

SURRENDER OF DUPLICATE CERTIFICATES.

SEC. 111. In every case where the clerk or any register of deeds is requested to enter a new certificate in pursuance of an instrument purporting to be executed by the registered owner, or by reason of any instrument or proceedings which divest the title of the registered owner against his consent, if the outstanding owner's duplicate certificate is not presented for cancellation when such request is made, the clerk or register of deeds shall not enter a new certicate, but the person claiming to be entitled thereto may apply by petition to the court. The court, after hearing, may order the registered owner or any person withholding the duplicate to surrender the same, and direct the entry of a new certificate upon such surrender.

If in any case the person withholding the duplicate certificate is not amenable to the process of the court, or if for any reason the outstandng owner's duplicate certificate can not be delivered up, the court may by decree annul the same, and order a new certificate of title to be entered. Such new certificate and all duplicates thereof shall contain a memorandum of the annulment of the outstanding duplicate.

If in any case an outstanding mortgagee's or lessee's duplicate certificate is not produced and surrendered when the mortgage is discharged or extinguished or the lease is terminated, like proceedings may be had to obtain registration as in the case of the nonproduction of an owner's duplicate.

AMENDMENT AND ALTERATION OF CERTIFICATES OF TITLE.

SEC. 112. No erasure, alteration, or amendment shall be made upon the registration book after the entry of a certificate of title or of a memorandum thereon and the attestation of the same by the clerk or any register of deeds, except by order of the court. Any registered owner or other person in interest may at any time apply by petition to the court, upon the ground that registered interests of any description, whether vested, contingent, expectant, or inchoate, have terminated and ceased; or that new interests have arisen or been created which do not appear upon the certificate; or that any error, omission, or mistake was made in entering a certificate or any memorandum thereon, or on any

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duplicate certificate; or that the name of any person on the certificate has been changed; or that the registered owner has been married; or if registered as married, that the marriage has been terminated; or that a corporation which owned registered land and has been dissolved has not conveyed the same within three years after its dissolution; or upon any other reasonable ground; and the court shall have jurisdiction to hear and determine the petition after notice to all parties in interest, and may order the entry of a new certificate, the entry or cancellation of a memorandum upon a certificate, or grant any other relief upon such terms and conditions, requiring security if necessary, as it may deem proper: *Provided, however,* That this section shall not be construed to give the court authority to open the original decree of registration, and that nothing shall be done or ordered by the court which shall impair the title or other interest of a purchaser holding a certificate for value and in good faith, or his heirs or assigns, without his or their written consent.

Any petition filed under this section and all petitions and motions filed under the provisions of this Act after original registration shall be filed and entitled in the original case in which the decree of registration was entered.

SERVICE OF NOTICES AFTER REGISTRATION.

SEC. 113. All notices required by or given in pursuance of the provisions of this Act by the clerk or any register of deeds, after original registration, shall be sent by mail to the person to be notified at his residence and post-office address as stated in the certificate of title, or in any registered instrument under which he claims an interest, in the office of the clerk or register of deeds, relating to the parcel of land in question.

All notices and citations directed by special order of the court under the provisions, of this Act, after original registration, may be served in the manner above stated, and the certificate of the clerk shall be conclusive proof of such service: *Provided, however,* That the court may in any case order different or further service, by publication or otherwise, and shall in all cases do so when the interests of justice require such action.

FEES FOR REGISTRATION.

SEC. 114. (*As amended by Acts Nos. 1108 and 1648.*) Fees payable under this Act shall be as follows:

From the time of filing the application until the final determination of each case, for all services performed by the clerk or his deputies in each case, except the taking of affidavits or acknowledgments, including filing, entering, indexing, and recording all documents, plans, orders, decrees, and other papers, all notices by mail or publication, and a certified copy of the decree of registration, if any there be, there shall be paid by the applicant to the clerk the sum in the following table corresponding to the value of the property, which shall be the assessed value if the property is assessed, otherwise the market value, determined as provided in section ninety-nine of this Act:

Property not exceeding one hundred dollars in value, five dollars.

Property not exceeding five hundred dollars but over one hundred dollars in value, fifteen dollars.

Property not exceeding one thousand dollars but over five hundred dollars in value, twenty dollars.

Property not exceeding five thousand dollars but over one thousand dollars in value, twenty-five dollars.

Property not exceeding twenty-five thousand dollars but over five thousand dollars in value, forty dollars.

Property not exceeding fifty thousand dollars but over twenty-five thousand dollars in value, fifty dollars.

Property exceeding fifty thousand dollars in value, one hundred dollars.

For all services by a sheriff or other officer under this Act, the same fees as are now provided by law for like services.

For entry of original certificate of title, and issuing one duplicate certificate, three dollars.

For making and entering a new certificate of title, including issue of one duplicate certificate, one dollar.

For each duplicate certificate, after the first, fifty cents.

For the registration of every instrument, whether single or in duplicate or triplicate, including entering, indexing, and filing the same, and attesting regis-

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tration thereof, and also making and attesting copy of memorandum on one instrument or on a duplicate certificate when required, one dollar and fifty cents.

For making and attesting copy of memorandum on each additional instrument or duplicate certificate if required, fifty cents.

For filing and registering an adverse claim, three dollars.

For entering statement of change of residence or post-office address, including indorsing and attesting the same on a duplicate certificate, twenty-five cents.

For entering any note in the entry book or in the registration book, twenty-five cents.

For the registration of a suggestion of death or notice of bankruptcy, insolvency, or analogous proceeding, twenty-five cents.

For the registration of a discharge or release of mortgage or other instrument creating an incumbrance, fifty cents.

For the registration of any levy, or of any discharge or dissolution of any attachment or levy, or of any certificate of or receipt for the payment of taxes, or notice of any pending action, or of a judgment or decree, fifty cents.

For indorsing on any mortgage, lease, or other instrument a memorandum of partition, one dollar.

For every petition filed under this Act after original registration, one dollar.

For a certified copy of any decree or registered instrument, the same fees as are provided by the Code of Procedure in Civil Actions and Special Proceedings for clerks of Courts of First Instance for like services.

In all cases not expressly provided for by the law the fees of all public officers for any official duty or service under this Act shall be at the same rate as those prescribed herein for like services.

PENALTIES.

SEC. 115. Certificates of title and duplicate certificates issued under this Act shall be subjects of larceny.

SEC. 116. Whoever knowingly swears falsely to any statement required to be made under oath by this Act shall be guilty of perjury and liable to the penalties provided by law for perjury.

SEC. 117. Whoever fraudulently procures, or assists in fraudulently procuring or is privy to the fraudulent procurement of any certificate of title or owner's duplicate certificate, or of any entry in the register or other book kept in the office of the clerk or of any register of deeds, or of any erasure or alteration in any entry in any set of books or in any instrument authorized by this Act, or knowingly defrauds or is privy to defrauding any person by means of a false or fraudulent instrument, certificate, owner's duplicate certificate, statement or affidavit affecting registered land, shall be fined not exceeding five thousand dollars or imprisoned not exceeding five years, or both, in the discretion of the court.

SEC. 118. (1) Whoever forges or procures to be forged or assists in forging the seal of the clerk or of any register of deeds, or the name, signature, or handwriting of any officer of the court or of the register of deeds, in case where such officer is expressly or impliedly authorized to affix his signature; or

(2) Fraudulently stamps or procures to be stamped or assists in stamping any document with any forged seal of the clerk or register of deeds; or

(3) Forges, or procures to be forged, or assists in forging the name, signature, or handwriting of any person whosoever to any instrument which is expressly or impliedly authorized to be signed by such person under the provisions of this Act; or

(4) Uses any document upon which an impression, or part of the impression, of any seal of the clerk or of a register of deeds has been forged, knowing the same to have been forged, or any document the signature to which has been forged, knowing the same to have been forged, shall be imprisoned not exceeding ten years or fined not exceeding five thousand dollars, or both, in the discretion of the court.

Prosecutions for offenses for violations of any of the provisions of this Act shall be instituted and conducted in the proper Court of First Instance.

SEC. 119. Whoever, with intent to defraud, sells and conveys registered land knowing that an undischarged attachment or any other incumbrance exists thereon which is not noted by memorandum on the duplicate certificate of the title, without informing the grantee of such attachment or other incumbrance before the consideration is paid, shall be punished by imprisonment not exceed-

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ing three years or by a fine not exceeding one thousand dollars, or by both, in the discretion of the court.

SEC. 120. No conviction for any act prohibited by this Act shall affect any remedy which any person aggrieved or injured by such act may be entitled to by law against the person who has committed such act or against his estate.

REGISTER OF DEEDS IN MANILA.

SEC. 121. Wherever in this Act the phrase "the register of deeds in the province where the land lies," or an equivalent phrase, occurs, it shall be construed to include and be applicable to the register of deeds in the city of Manila.

PUBLIC LANDS.

SEC. 122. Whenever public lands in the Philippine Islands belonging to the Government of the United States or to the Government of the Philippine Islands are alienated, granted, or conveyed to persons or to public or private corporations, the same shall be brought forthwith under the operation of this Act and shall become registered lands. It shall be the duty of the official issuing the instrument of alienation, grant, or conveyance in behalf of the Government to cause such instrument, before its delivery to the grantee, to be filed with the register of deeds for the province where the land lies and to be there registered like other deeds and conveyances, whereupon a certificate shall be entered as in other cases of registered land, and an owner's duplicate certificate issued to the grantee. The deed, grant, or instrument of conveyance from the Government to the grantee shall not take effect as a conveyance or bind the land, but shall operate only as a contract between the Government and the grantee and as evidence of authority to the clerk or register of deeds to make registration. The act of registration shall be the operative act to convey and affect the lands, and in all cases under this Act registration shall be made in the office of the register of deeds for the province where the land lies. The fees for registration shall be paid by the grantee. After due registration and issue of the certificate and owner's duplicate, such land shall be registered land for all purposes under this Act.

ACT, HOW CONSTRUED.

SEC. 123. This Act shall be construed liberally so far as may be necessary for the purpose of effecting its general intent.

CONTINUANCE OF EXISTING SYSTEM AS TO UNREGISTERED LAND.

SEC. 124. (*As amended by Act No. 700.*) As to lands not registered in accordance with the provisions of this Act, the system of registration and recording heretofore established by law in these islands shall continue and remain in force, except in so far as hereinafter modified, and the evidential weight given by existing law to titles registered as existing law now provides shall be accorded to such titles in the hearings had under this Act before the examiners and before the court. The duties of registering and recording land titles in accordance with the law heretofore existing shall be performed in the several provinces and the city of Manila by the registers of deeds in this Act provided, after such registers of deeds have been appointed: *Provided, however,* That the originals of deeds, mortgages, leases, and other instruments affecting the title to unregistered land shall not be retained by notaries public or other officials before whom the same are solemnized, but after having been duly executed may be delivered to the grantee, mortgagee, lessee, or other person entitled to the same and be by him presented to the register of deeds for the province where the land lies for registration and recording, in the same manner and with the same legal effect that copies thereof certified by notaries public under existing law are registered and recorded. The register of deeds upon receiving any such deed, mortgage, lease, or other instrument dealing with land not registered under this Act shall indorse upon the instrument so received the true year, month, day, hour, and minute when the same is received, and the same shall be deemed to have been registered and recorded as unregistered land from the time of the indorsement of such memorandum thereon. He shall also indorse thereon the volume and page wherein the same is registered and recorded. After the due registration and recording of such instrument the

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owner thereof shall be entitled to the custody and possession of the same. The original instrument, the record thereof in the books of the register of deeds, and any certified copy of such record shall be competent evidence in any court of justice. The fees of the register of deeds for registering and recording any such instrument shall be the same as those now provided by law for registering and recording a certified copy of a notarial instrument dealing with land.

All the powers and faculties conferred by sections two hundred and sixty-eight (paragraph five), two hundred and sixty-nine and two hundred and seventy-six of the Mortgage Law, and sections one hundred and twelve and one hundred and twenty of the regulations for its execution, upon the president of the audiencia and the judges of First Instance in the matter of inspecting registries of property, receiving consultations from the registers of deeds and hearing and determining all questions affecting the registration of instruments, are hereby conferred upon the Court of Land Registration created by this Act.

SEC. 125. Until registers of deeds shall be appointed in accordance with the provisions of this Act, the officials performing the duties of registrars and recorders of deeds in the several provinces and in the city of Manila shall be registers of deeds and perform the duties of registers of deeds as defined by this Act. Their deputies shall be deputy registers of deeds. All laws relative to existing registrars of deeds and recorders, their deputies, including their compensation, clerk hire, and expenses, shall extend to registers of deeds and their deputies under this Act so far as the same may be applicable.

NOTARIES PUBLIC.

SEC. 126. All notaries public in the Islands, and all other officials and persons having in their possession notarial books, records, protocols, archives, and other documents, shall immediately deliver to the Chief of the Bureau of Archives all such notarial books, records, protocols, archives, and documents in accordance with the provision of section eighty of Act Numbered One hundred and thirty-six, entitled "An Act providing for the organization of courts in the Philippine Islands," and hereafter notaries public shall only have the powers and perform the duties prescribed for notaries public in sections eighty-one to ninety-one, inclusive, of said Act Numbered One hundred and thirty-six.

FORMS.

SEC. 127. (*As amended by Act No. 700.*) Deeds, conveyances, mortgages, leases, releases, and discharges affecting lands, whether registered under this Act or unregistered, shall be sufficient in law when made substantially in accordance with the following forms, and shall be as effective to convey, encumber, lease, release, discharge, or bind the lands as though made in accordance with the more prolix forms heretofore in use: *Provided*, That every such instrument shall be signed by the person or persons executing the same, in the presence of two witnesses, who shall sign the instrument as witnesses to the execution thereof, and shall be acknowledged to be his or their free act and deed by the person or persons executing the same, before the judge of a court of record or clerk of a court of record, or a notary public, or a justice of the peace, who shall certify to such acknowledgment substantially in the form next hereinafter stated.

1. Form of acknowledgment by person executing deed of conveyance, mortgage, lease, release, or discharge affecting land.

UNITED STATES OF AMERICA, PHILIPPINE ISLANDS.

Province (or city) of _____ (date).

At the municipality of _____, in said province, on this _____ day of _____, A. D. 19__, personally appeared _____, married _____, known to me to be the same person (or persons) who executed the foregoing instrument and acknowledged that the same is his (or their) free act and deed. The cedula certificates of the parties to the instrument were exhibited to me, being Nos. _____, issued at _____, dated _____, 19__.

Before me,

_____

(Notary public or other official authorized to administer oaths.)

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2. Deed of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to said _____ and his heirs and assigns that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, and Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner in accordance with the provisions of The Land Registration Act, my title thereto being evidenced by Certificate Number _____ in the land records of said province.

In witness whereof, I have hereunto signed my name on this _____ day of _____, A. D. 19____.

_____

Signed in the presence of:

_____

_____

(To be followed by acknowledgment according to Form 1.)

3. Deed of land not registered under this Act, without covenants of warranty.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to the said _____, his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of_____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description).

In witness whereof, I have hereunto signed my name, on this_____ day of _____, A. D. 19____

_____

Signed in the presence of:

_____

_____

(Acknowledgment.)

4. Deed of land not registered under this Act, with covenants of warranty.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby sell and convey to the said _____, his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of_____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description); and the said _____(seller) does hereby covenant and agree with the said _____ (purchaser) that he is lawfully seized in fee of said premises, that they are free from all incumbrances, that he has a perfect right to convey the same, and that he will warrant and forever defend the same unto the said _____ (purchaser), his heirs and assigns, against the lawful claims of all persons whomsoever (or insert other covenants, whatever they may be).

In witness whereof, etc.

_____

Signed in presence of:

_____

_____

(Acknowledgment.)

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5. Mortgage of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, in consideration of _____ dollars, to me paid by _____, of _____, in the Province of _____, in the Philippine Islands, do hereby, by way of mortgage, convey to the said _____ _____, his heirs and assigns, that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner, in accordance with the provisions of The Land Registration Act, my title thereto being evidenced by Certificate Number _____, in the land records of said province; provided, nevertheless, that if I, the said _____ (mortgagor) shall duly pay, or cause to be paid, to the said _____ (mortgagee) my certain promissory notes of this date by me signed, and payable to the said _____ (mortgagee), all dated on this date, each for the sum of _____ dollars, and payable in one, two, and three years from date (or otherwise, as the case may be), with lawful interest, then this mortgage shall be thereby discharged and of no further effect, otherwise it shall remain in full force and be enforceable in the manner provided by law.

In witness whereof, etc.

_____

Signed in the presence of:

_____

_____

(Acknowledgment.)

6. Mortgage of land not registered under this Act.

This mortgage may be in the same form as that prescribed in Form No. 5, but omitting that portion of Form No. 5 which describes the land as registered under the Land Registration Act, and including such covenants of warranty as the parties may agree upon.

7. Discharge of mortgage of land registered under this Act.

I, _____, married _____, of _____, in the Province of _____, in the Philippine Islands, mortgagee of the land embraced in Certificate Number _____ in the land records of the Province of _____, by virtue of a mortgage executed by _____, of _____, in the Province of _____, in the Philippine Islands, on the _____ day of _____, 19____, having received the full consideration named as the condition of said mortgage, do hereby forever release and discharge the same.

In witness whereof, etc.

_____

Signed in the presence of:

_____

_____

(Acknowledgment.)

8. Discharge of mortgage of land not registered under this Act.

The discharge in this case may be as in Form No. 7, varying the description of the mortgage to suit the facts.

9. Lease of land registered under this Act.

I, _____, married _____ of _____, in the Province of _____, in the Philippine Islands, in consideration of the agreements hereinafter contained, do hereby lease unto _____, of _____, in the Province of _____, in the Philippine Islands, and his assigns (if the lease is to be assignable), that parcel of land, together with all the buildings and improvements thereon, situated in the municipality of _____ _____, in the Province of _____, in the Philippine Islands, bounded and described as follows (here insert boundaries and description), of which land I am the registered owner, in accordance with the provisions of The Land Registration Act, my title thereto being evi-

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denced by Certificate Number ---------- in the land records of said province, for the period of ---------- years from this date.

And I, the said lessee, in consideration of this lease, do hereby promise, for myself and my heirs and assigns, that I will cause to be paid to the said ---------- (lessor), an annual rental (or monthly rental) of ---------- dollars per year (or per month, as the case may be) during the whole period of this lease, payable on the ---------- day of ---------- of each year (or at such other times as may be agreed upon).

(Other special agreements of the lease may be here inserted.)

In witness whereof, etc.

Signed in the presence of:

(Acknowledgment.)

10. Lease of land not registered under this Act.

This lease may be as in Form No. 9, omitting that portion thereof that relates to the certificate of title, and inserting such covenants of warranty as may be agreed upon.

11. Release of leased lands, whether registered under this Act or not.

Such release may be as in Forms Nos. 7 and 8, for the discharge of mortgages, using the term "release," instead of "discharge," and inserting such description as fully identifies the lease.

SEC. 128. (*As amended by Act No. 700.*) The Court of Land Registration, for the purpose of giving publicity to the law and to facilitate the work of the court, is authorized to have printed for free distribution such number of blank forms of application, rules and regulations, forms of deeds, mortgages and leases, or other matter of use or information to the public in the registration of lands as the Court may in its discretion deem proper.

SEC. 129. (*As amended by Acts Nos. 572 and 700.*) This Act shall take effect February first, nineteen hundred and three, and the law in force prior to January first, nineteen hundred and three, in reference to the registration of titles to lands in the Philippine Islands, the execution of conveyances and the duties of notaries public and their appointment, is hereby continued in force for the month of January, nineteen hundred and three, including the first day thereof.

Enacted, November 6, 1902.

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THE FOREST MANUAL

Containing

The Forest Act (No. 1148), extracts from other laws of the Philippine Commission relating to the forest service, and the Forest Regulations prepared in accordance with the provisions of the Forest Act.

LETTER OF TRANSMITTAL.

DEPARTMENT OF INTERIOR, BUREAU OF FORESTRY,
OFFICE OF THE CHIEF OF BUREAU,
Manila, June 30, 1904.

SIR: I have the honor to transmit herewith the manuscript of "The Forest Manual," containing the Forest Act, extracts from other laws relating to the forest service, the forest regulations, and notes, and recommend its publication.

Very respectfully,

GEORGE P. AHERN,
Captain, Ninth United States Infantry,
Chief of Bureau of Forestry.

The SECRETARY OF THE INTERIOR,
Manila, P. I.

The Forest Act—No. 1148 (as amended by Act No. 1575).

AN ACT To regulate the use of the public forests and forest reserves in the Philippine Islands and repealing General Orders, Numbered Ninety-two, series of nineteen hundred, Act Numbered Two hundred and seventy-four, and sections twenty of Act Numbered Forty-nine, eleven of Act Numbered One hundred and nineteen, and eleven of Act Numbered One hundred and twenty.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. The short title of this Act shall be "The Forest Act."

SEC. 2. The public forests and forest reserves of the Philippine Islands shall be held and administered for the protection of the public interest, the utility and safety of the forests, and the perpetuation thereof in productive condition by wise use; and it is the purpose of this Act to provide for the same.

SEC. 3. The public forests shall include all unreserved public lands covered with trees of whatever age.

SEC. 4. Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the Civil Governor may set apart forest reserves from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof, and thereafter such forest reserves shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses, and shall be administered, except as provided in this section, in like manner as the public forests under this Act: *Provided*, That the Civil Governor may in like manner by proclamation alter or modify the boundaries of any forest reserve from time to time, or revoke any such proclamation, and upon such revocation such forest reserve shall be and become part of the public lands as though such proclamation had never been made.

SEC. 5. The public forests and forest reserves and the timber, firewood, gums, and other products thereof shall not be sold, entered, leased, or otherwise disposed of except as herein provided: *Provided*, That any mining claim as de-

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fined in section one of Act Numbered Six hundred and twenty-four, entitled "An Act prescribing regulations governing the location and manner of recording mining claims, and the amount of work necessary to hold possession of a mining claim, under the provisions of the Act of Congress approved July first, nineteen hundred and two, entitled 'An Act temporarily to provide for the administration of the affairs of civil government in the Philippine Islands, and for other purposes,'" in any of the public forests and forest reserves shall be entered only as provided in said Act Numbered Six hundred and twenty-four, and the provisions of this Act shall not be applicable to the entry and location of such claims, but they shall be governed by Act Numbered Six hundred and twenty-four exclusively: *And provided further*, That the authority given by the Chief of the Bureau of Forestry, as hereinafter provided, to issue licenses for the taking of stone and earth from public forests and forest reserves shall be understood to apply only when such stone and earth is taken from lands not more valuable for mining purposes than for other purposes, and therefore not subject to entry as a mining claim.

SEC. 6. No prescriptive right to the use, possession, or enjoyment of any forest product, nor any permanent concession, continuing right, privilege, or easement, of any kind whatsoever, upon or within or respecting the products of the public forests or forest reserves, shall accrue or be granted except as provided in this Act. But the public forests and forest reserves shall be and remain open of access for all lawful purposes to the people of the Philippine Islands except as provided in this Act.

SEC. 7. Lands in public forests, upon the certification of the Chief of the Bureau of Forestry that said lands are better adapted and more valuable for agricultural than for forest purposes and not required by the public interests to be kept under forest, shall be declared by the Secretary of the Interior to be agricultural lands.

When in his opinion the public interests so require, the Chief of the Bureau of Forestry may make application to the Chiefs of the Bureaus of Agriculture and Public Lands for the detail of an official from each of said Bureaus to form, with an official from the Bureau of Forestry, a committee for the purpose of assisting said Chief of the Bureau of Forestry in making this certification, and upon the receipt of such application it shall be the duty of each of said Chiefs of the Bureaus of Agriculture and Public Lands to direct one of his subordinates to render the assistance applied for.

SEC. 8. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prescribe such regulations not inconsistent with the provisions of this Act as may be expedient or necessary for the protection, management, reproduction, occupancy, and use of the public forests and forest reserves, and the said Chief, with the approval of the Secretary of the Interior, is hereby authorized to alter and revise such regulations. He shall in particular provide for the use of the public forests and forest reserves in such manner as to insure for the future a continued supply of valuable timber and other forest products.

SEC. 9. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, upon proper terms which he may deem reasonable, lease, as herein provided, tracts of land not exceeding four hectares in extent in the public forests and forest reserves, to any person or to any association of persons holding timber licenses, for occupancy as sites for sawmills or timber depots, and the Secretary of the Interior may grant free rights of way through the public lands to enable such persons or association of persons to get access to the land to which such licenses apply.

SEC. 10. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may select for sale or disposal, and may sell or dispose of by license, from the public forests and forest reserves, at rates of charge to be established by him in accordance with the provisions of sections eleven and twelve of this Act, any timber, firewood for commercial use, gums, resins, and other forest products, whose removal will not be detrimental to the public forests or forest reserves or to the interests which depend upon them.

SEC. 11. (*As amended by Act No. 1575.*) For the purposes of this Act the various native trees are divided into four groups:

The first group shall include acle, betis, baticulin, camagon, ebony, ipil, lanete, mancono, molave, narra, tindalo, and yacal.

The second group shall include alupag, aranga, banaba, bansalaguin, banuyo, batitnan, bolongeta, calamansanay, canlantas, dungon, guijo, macaasin, malacadios, mangachapuy, palo Maria, supa, teak, and tucan-calao.

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The third group shall include agoho, amuguis, anubing, apitong, batino, bitanhol, catmon, calumpit, cupang, dalinsi, dita, dungonlate, malacmalac, malapapaya, malasantol, mayapis, nato, palosapis, panao, sacat, santol, tamayuan, and tanguile.

The fourth group shall include anaho, anam, apuit, bacao, balacat, balinhasay, batete, bayoc, bonga, bulao, lauan, malaanonang, malabalac, malabonga, mangasinoro, manicnic, pagatpat, and pagsainguin.

SEC. 12. (*As amended by Act No. 1575.*) The metric system of weights and measures, as adopted by sections thirty-five hundred and sixty-nine and thirty-five hundred and seventy of the Revised Statutes of the United States, shall be used.

On each cubic meter of timber which may be cut in any public forest or forest reserve in any of the provinces of the Philippine Islands for domestic sale or consumption, or for export, there shall be paid, within thirty days from date of the receipt by the owner or his agent of the order of payment of the Government charge on the same, into the Insular Treasury, as provided by existing law, the following sums:

On all timber included in the first group, two pesos and fifty centavos.

On all timber included in the second group, one peso and fifty centavos.

On all timber included in the third group, one peso.

"On all timber included in the fourth group and on all nonenumerated timber, fifty centavos: *Provided*, That the taxes imposed in this section on ebony and camagon shall be charged on said timbers when presented for measurement and appraisal with the sapwood still attached; and the number of cubic meters in each piece of timber so measured shall include the sapwood attached to the same, and when ebony or camagon timber from which the sapwood has been stripped is presented for measurement and appraisal there shall be assessed and collected the following sums:"

On each cubic meter of ebony, six pesos. On each cubic meter of camagon, four pesos and fifty centavos.

The volume of all round timber shall be ascertained by multiplying the area of the small end by the length of the log. The volume of all squared timber shall be ascertained by multiplying the average cross section by the length, to which twenty-five per centum shall be added for loss in squaring. The volume of all sawn timber shall be ascertained by multiplying the average cross section by the length, to which fifteen per centum shall be added for loss in sawing.

All timber included in the preceding section in the third and fourth groups and all nonenumerated timber cut in any province, known in the market under the name of "raja" and which shall not exceed one and one-half meters in length and fifteen centimeters in diameter, shall be classed as firewood, and the following taxes shall be collected thereon:

On all firewood consisting of "rajas" from sixty centimeters to one and one-half meters in length, and from seven centimeters to fifteen centimeters in diameter, one peso for each one thousand rajas.

On all firewood consisting of pieces of timber less than sixty centimeters in length and less than seven centimeters in diameter, ten centavos per cubic meter: *Provided*, That whenever in the opinion of the Chief of the Bureau of Forestry the preservation and use of the public forests and forest preserves shall render necessary the removal of the tops of fallen timber, said tops when removed in accordance with the regulations prescribed by the Chief of the Bureau of Forestry, shall be exempted from the payment of any tax imposed in this section on timber or firewood or other forest products.

On all gums and resins and other forest products gathered or removed from any province, there shall be paid on the actual market value thereof ten per centum. The Collector of Internal Revenue and the Chief of the Bureau of Forestry shall upon the passage of this Act, and from time to time thereafter, make a joint assessment of the actual market value of the various products on which taxes are imposed in this section; said assessments shall be made from the most reliable data available and shall be published in the Official Gazette for the information of taxpayers.

SEC. 13. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, as herein provided, issue licenses for the cutting, collection, and removal of timber, firewood, gums, resins, and other forest products from the public forests and forest reserves. Every license so issued shall specify in detail the rights to which it entitles the holder and shall provide, whenever practicable, for exclusive territory in similar products to each licensee. All licenses for timber shall provide for the selection of said timber

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before cutting: *Provided*, That when absolutely necessary the selection of timber or the granting of exclusive territory may, in the discretion of the Chief of the Bureau of Forestry, be omitted in any license terminating not later than June thirtieth, nineteen hundred and eight, after which date the selection of timber and the granting of exclusive territory whenever practicable shall be required.

SEC. 14. No license granted under the provisions of this Act shall continue in force for more than twenty years. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, in granting any exclusive license, prescribe such terms, conditions, and limitations not inconsistent with the provisions of this Act, including a minimum amount of timber to be cut within a specified period or periods of time, as may be deemed by the Chief of the Bureau of Forestry and Secretary of the Interior to be in the public interest, and may provide in such licenses for forfeiture thereof in case of violation of such terms, conditions, or limitations.

SEC. 15. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall publicly announce what classes of licenses shall be issued.

SEC. 16. The Chief of the Bureau of Forestry may, for violations of the Forest Act or of the regulations, to be determined and declared by him, with the approval of the Secretary of the Interior, revoke or temporarily suspend any license.

SEC. 17. A gratuitous license to cut and use timber for mining purposes shall be granted on application to the holder, locator, owner, lessee, or operator of a mining claim. Said license shall be limited to the claim on which the timber is cut, and no timber shall be used under such license except in the development of the claim upon which it is cut. Said license shall specify the kinds and uses of the timber to which it entitles the holder, and the territorial limits within which it is valid. A miner's timber license to cut timber in the public forests or forest reserves other than that standing on the claim and desired for the development of said claim may be obtained on application by the holder, locator, owner, lessee, or operator of a mining claim. Said license shall specify the kinds and uses of the timber to which it entitles the holder and the territorial limits within which it is valid. The Government charge on timber thus used under a miner's timber license shall be one-half the rate prescribed for the province within which said timber is cut.

SEC. 18. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may designate for sale or disposal, and may sell or dispose of by license from the public forests and forest reserves, stone or earth the removal of which will not be detrimental to the public forests or forest reserves or to the interests which depend upon them. The rates of charge shall be determined by him in each case with like approval.

The Chief of the Bureau of Forestry may, with the approval of the Secretary of the Interior, grant licenses for the removal of such stone or earth, and in such licenses may prescribe such terms, conditions, and limitations, including a minimum amount of stone or earth to be removed within a specified period or periods of time as may be deemed by the Chief of the Bureau of Forestry and the Secretary of the Interior in the public interest, and may provide in such licenses for forfeiture thereof in case of violation of such terms.

SEC. 19. The Chief of the Bureau of Forestry, under regulations to be prescribed by him, with the approval of the Secretary of the Interior, may grant gratuitous licenses for the free use of timber, firewood, gums, resins, and other forest products, and of stone and earth, in reasonable quantities and within definite territorial limits, for domestic purposes, and not for sale, barter, or any other use whatsoever. He may also, within definite territorial limits, similarly prescribe the free use of forest products and of stone and earth for public works: *Provided*, That a gratuitous license for woods of the first group shall not be issued.

SEC. 20. The Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, may, when the public interests so require, make requisition upon the Bureau charged with public surveys, to proceed to demarcate, establish on the ground, and erect monuments along the boundaries of any public forest or forest reserves; and it shall be the duty of the last-named Bureau to comply with said requisition: *Provided*, That no duplication of work shall be caused by such demarcation: *And provided further*, That the cost of such demarcation shall be defrayed from the revenues of the public forests or forest reserves.

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SEC. 21. In order to promote uniformity and cooperation in the forest work of the Philippine Islands and the United States, and to facilitate the comparison of results, the methods of the Philippine Bureau of Forestry in forest measurements, timber tests, silvicultural observations, and other forest work, shall, so far as practicable, and in the discretion of the Chief of the Bureau of Forestry, be based upon the corresponding methods of the Bureau of Forestry of the United States Department of Agriculture.

SEC. 22. No officer or employee of the Bureau of Forestry shall have any pecuniary interest in any forest or in any business in lumber, firewood, gums, resins, or other forest products, or stone or earth, in the Philippine Islands: *Provided*, That this prohibition shall not apply to guards or assistant guards, or to persons temporarily acting as guards or assistant guards.

SEC. 23. Every official, employee, or agent of the Bureau of Forestry is empowered to make arrests without process in or upon the public forests or forest reserves, or territory adjacent thereto, of any person who is committing or attempting to commit any violation of this Act or the regulations established thereunder, and it shall be the duties of governors of provinces, the Philippines Constabulary, and of municipal presidents to assist in making the arrests prescribed in this section when called upon to do so. Where the person or persons found violating the provisions of this Act are members of a non-Christian tribe, they shall be dismissed with a warning in the case of a first offense, but upon conviction of a second offense shall be punished as in this Act provided for violations hereof. When any arrest is made under the provisions of this section without warrant, the official, employee, or agent of the Bureau of Forestry shall obtain a warrant from competent authority at the earliest practicable moment under the circumstances. Prisoners with or without warrant shall in all cases within twenty-four hours, if reasonably practicable, be brought before a judge or justice of the peace having jurisdiction over the offense for examination and release under bail if the offense is bailable.

SEC. 24. Every private owner of forest land shall register his title to the same with the Chief of the Bureau of Forestry. In the absence of such registration, wood cut from alleged private lands and not from public forests or forest reserves shall be considered as cut under license from public forests or forest reserves, and shall be subject to all provisions of this Act and of the regulations established thereunder in such case applicable.

When in his opinion the public interests so require, the Chief of the Bureau of Forestry may make application to the examiner of the Court of Land Registration or the fiscal of the province in which the land lies, for such assistance as may be necessary in the examination of the titles thereof, with a view to their registration in the Bureau of Forestry, and upon the receipt of such application it shall be the duty of the fiscal or examiner of titles, as the case may be, to render the assistance applied for by the Bureau of Forestry.

SEC. 25. The cutting, clearing, or destroying of the public forests or forest reserves, or any part thereof, for the purpose of making cainguins, without lawful authority, is hereby prohibited, and whoever, in violation of this provision, shall cut, clear, or destroy the same, for such purpose, or shall willfully or negligently set fire thereto, shall, upon conviction by a court of competent jurisdiction, be punished by a fine not exceeding a sum equivalent to twice the regular Government charge upon the timber so cut, cleared, or destroyed, and, in addition thereto, by imprisonment not exceeding thirty days, in the discretion of the court.

The cutting, collecting, destroying, or removing of timber or other forest products, stone, or earth from the public forests or forest reserves for any other purpose than making a cainguin, without license, permit, or other sufficient authority, is hereby prohibited, and any person who, in violation of this provision, shall so cut, collect, destroy, or remove the same, by himself, through an agent or employee, or for account of another, shall, in addition to the payment of the regular Government charge on such timber, forest products, stone, or earth, be subject to the payment of an additional sum equivalent to the regular Government charge thereon, which shall be collected as in this Act provided in the case of other Government charges.

SEC. 26. Whenever an exclusive license of any class shall have been issued (to any person, company, corporation, or other association) for the cutting or removing, from the public forests or forest reserves, of timber, firewood, or other forest products, stone, or earth, it shall be unlawful for any other person, company, corporation, or association, while such license is in force, to enter or operate within the territory covered by such exclusive license contrary to the

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terms thereof: *Provided*, That the residents within or adjacent to said territory may be permitted to cut or remove timber, firewood, other forest products, stone, or earth for domestic purposes.

If, contrary to the provisions of this section, any person, company, corporation, or other association shall enter upon, and shall cut or remove, or attempt to cut or remove, timber, firewood, other forest products, stone, or earth, said property so attempted to be cut or removed shall be seized as Government property, by the local forest official or other representative of the Forestry Bureau, and the person making the seizure shall promptly notify the holder of the exclusive license affected thereby, and the said property so seized shall be surrendered to him upon the payment of the proper Government charges thereon. Should, however, acceptance of said property and the payment of the charges thereon be refused, it shall be disposed of in the manner provided in section thirty-two of this Act for the disposition of forest products, stone, or earth on which the Government charges have not been paid, and the proceeds turned over to the proper official to whom the Government charges thereon should have been paid.

SEC. 27. No fire for clearing shall be started on private forests, woodlands, or fields adjoining public forests or forest reserves, without written permission first obtained from the local forest officer, or, in the absence of such officer, from the president of the municipality or settlement in which such forests, woodlands, or fields are situated. A copy of said written permission, when given by a president, shall be furnished by him to the local forest officer prior to the burning contemplated, when practicable; and said fires shall, when practicable, be lighted in the presence of such forest officer, president, or other duly authorized municipal official. Any person violating any of the provisions of this section shall, upon conviction, be subject to a fine not exceeding one hundred pesos or by imprisonment not exceeding thirty days, or both.

SEC. 28. Whoever, without authority of law, shall cut, make, manufacture, or have in his possession any Government marking hatchet or other marking implement, or any mark, poster, or other device officially used by officers of the Bureau of Forestry for the marking or identification of timber or other forest products, or any duplicate, counterfeit, or imitation thereof, or who shall fraudulently make or apply a Government mark to timber or any other forest product by means of any authentic or counterfeit Government marking hatchet, implement, mark, poster, or other device, or who shall fraudulently alter, deface, or remove Government marks from logs, stumps, firewood, or other forest products, shall, upon conviction be punished by a fine not exceeding five hundred pesos or by imprisonment not exceeding one year, or both.

SEC. 29. Neglect, unreasonable delay, or falsification in the making of reports, presentation of papers, or in other acts required by the provisions of this Act or the Forestry Regulations, or refusal to make reports, present papers, or to perform other acts required by this Act or the Forestry Regulations, shall, upon conviction, unless otherwise specially provided by law, be punished by a fine not to exceed two hundred pesos.

SEC. 30. Whoever, in violation of the provisions of this Act or of the Forestry Regulations or orders made in accordance herewith, transports, removes or discharges from any ship, boat, raft, car, cart, or other means of transportation, forest products, or stone or earth, or fails to pay the amounts due the Government on forest products, stone, or earth for a period of more than thirty days from the date of the receipt by him or his agent of the order directing the payment of the same, shall, in addition to the regular Government charges thereon, be subject to the payment of the sum of fifty per centum thereof, to be collected as in this Act provided for the collection of other Government charges.

SEC. 31. In the absence of a local forest officer the president of the municipality or settlement within which timber or other forest products are cut or collected shall act in his stead. Any president who, in the absence of a local forest officer, shall neglect, refuse, or unreasonably delay to prepare and sign a statement of timber or other forest products, stone, or earth cut or collected within the territory under his authority, or to inspect firewood or other forest products cut or collected for local use in said territory, or to perform other acts required by the provisions of this Act, shall, upon conviction, be subject to a fine not to exceed fifty pesos; and the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, shall prepare and furnish to local presidents the necessary instructions defining their duties under this Act.

SEC. 32. Forest products, stone, or earth on which the Government charges have not been paid as prescribed by law, and which have been seized in accord-

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ance with the provisions of this Act, shall be offered for sale at public auction, unless redeemed as hereinafter provided.

Fifteen days after any tax on any forest products, stone, or earth shall have become due and remains unpaid the local forest officer shall prepare and sign a certified copy of the records of his office showing the person or persons delinquent in payment of such taxes, the amounts thereof, and of the costs and additional charges respectively due from him or them. The forest officer thereupon shall proceed at once to seize the forest products, stone, or earth of the delinquent, and, unless redeemed as hereinafter provided, to sell at public auction, at some public place near where such property is seized, as the local forest officer shall determine, so much of the same as shall satisfy the tax, additional charges, and costs of seizure and sale, to the highest bidder for cash, after due advertisement by notice posted at the main entrance of the municipal building in the municipality in which such seizure is made and at a public and conspicuous place in the barrio in which the property was seized, stating the time, place, and cause of sale. The certified copy of the local forest officer's record of delinquents, attested by the secretary of the municipality within which the forest products were seized, approved by the forest inspector or forester in charge of the forest or inspection district, shall be his warrant for thus proceeding, and the purchaser at such sale shall acquire an indefeasible title to the property sold. Within two days after the sale the local forest officer shall make return of his proceedings in writing to the Bureau of Forestry and shall reserve a copy thereof to be kept by him as an official record, which shall also be attested by the municipal secretary: *Provided*, That if there is no bidder, or if the highest bid is only equal to or less than the sum total of the taxes, costs, and additional charges, the Chief of the Bureau of Forestry shall have dicretionary power to declare the same sold to the Government in satisfaction of such taxes, costs, and charges, and to invoice said products to the provincial supervisor or to any other public official charged with similar duties, for use in public works. The proceeds of such auction sales shall be paid to the official to whom the Government charges on the same should have been paid, who shall pay any surplus resulting from the sale over and above the tax, costs, and additonal charges to the person on account of whose delinquency the sale has been made.

SEC. 33. The owner of forest products seized may redeem the same from the local forest officer or collecting officer at any time after seizure and before sale by tendering to him the amount of the taxes, costs, and additional charges incurred up to the time of tender. The costs to be charged in making such seizure and sale shall embrace only the actual expense of seizure and preservation of the property pending the sale, and no charge shall be imposed for the services of the local forest officer or collecting officer or his deputy.

SEC. 34. Whenever authority is given in this Act for the imposition of any additional charge administratively, any person aggrieved by the imposition of such additional charge may, within twenty days after payment thereof, appeal therefrom to the Court of First Instance of the province in which the additional charge was imposed, and that court shall have jurisdiction, after due hearing, to confirm the imposition of the additional charge or to reverse or modify the same. Judgments of the Courts of First Instance in such cases shall be certified to the Bureau of Forestry, and, when in favor of the taxpayer, such judgment shall also be certified to the Auditor for the Philippine Islands who shall issue a certificate for payment by settlement warrant upon the Insular Treasurer, under the provisions of Act Numbered three hundred fifty-seven, and shall charge the amount of the warrant against the forestry collections of the province and municipality from which the timber was cut or the forest product obtained: *Provided*, That if an appeal from the judgment of the Court of First Instance is taken by the Bureau of Forestry, the Chief of said Bureau shall immediately notify the Auditor, who shall withhold settlement of the account pending final decision of the court.

SEC. 35. From and after May twentieth, nineteen hundred and four, there shall be paid on all timber, firewood, gums, resins, and other forest products, and stone and earth cut, gathered, or removed from all public forests or forest reserves on and after May twentieth, nineteen hundred and four, the respective taxes, costs, and additional charges imposed on such products in this Act. The payment of all such taxes shall be made within thirty days after the date of the receipt by the owner or his agent of the order directing payment, and the payment of the proceeds of auction sales, and of all charges and costs imposed by officers or employees of the Bureau of Forestry, shall be made immediately upon the receipt of the order directing payment, to collectors of internal revenue or to provincial or municipal treasurers, as provided by law. The charges

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prescribed by General Orders, Numbered Ninety-two, series of nineteen hundred, office of the United States Military Governor of the Philippine Islands, shall be collected on all forest products cut, gathered, or removed prior to May twentieth, nineteen hundred and four.

SEC. 36. All sums of money mentioned in this Act shall be deemed to be in Philippine currency.

SEC. 37. General Orders, Numbered Ninety-two, series of nineteen hundred, issued by the Military Governor of the Philippine Islands; Act Numbered Two hundred and seventy-four, entitled "An Act prohibiting the unauthorized destruction of timber on public lands;" section twenty of Act Numbered Forty-nine, entitled "An Act providing for the establishment of a civil government for the Province of Benguet;" section eleven of Act Numbered One hundred and nineteen, entitled "An Act extending the provisions of the Provincial Government Act and the Municipal Code to the Province of Occidental Negros;" and section eleven of Act Numbered One hundred and twenty, entitled "An Act extending the provisions of the Provincial Government Act and the Municipal Code to the Province of Oriental Negros," are hereby repealed.

SEC. 38. This Act shall take effect on its passage, except sections eleven, twelve, and thirty-seven, which shall take effect May twentieth, nineteen hundred and four.

Enacted, May 7, 1904.

Acts Relating to Forests and Forest Products.

[ACT No. 163.]

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SEC. 2. There is hereby appropriated out of the Insular Treasury from funds not otherwise appropriated a sum sufficient to return to the provincial governments now or hereafter organized under the General Provincial Government Act, all the internal revenue collections made between the first of January, 1901, and the first of July, 1901, in said provinces, in accordance with Section 37 of Act No. 133, one-half to be paid into the provincial treasury and the other half to be paid to the Provincial Treasurer, to be by him distributed to the municipalities in which the same were collected. The authority for payment hereby conferred may be exercised from time to time in partial payments to provincial treasurers until all that is due under Section 37 of Act No. 133 shall be paid. The warrants for the same shall be drawn upon the application of the provincial treasurers in the amounts certified to be correct by the Insular Collector of Internal Revenue, approved by the Insular Auditor. In so far as the manner of payment provided in Section 37 of Act No. 133 is inconsistent with that herein provided, such Section No. 37 is hereby modified.

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Enacted, July 13, 1901.

[No. 165.]

AN ACT Prescribing certain duties for collectors of customs, collectors of internal revenue, and provincial treasurers with reference to the collection of taxes on forest products.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. Any person who desires to ship forest products of whatever sort to a foreign port shall produce to the Collector of Customs at the port of shipment a receipt from a forestry official showing that the forestry taxes on these products have been paid, unless such products are taken from private land the title to which has been properly registered in the office of the Forestry Bureau at Manila, in which case the shipper shall produce a certificate from a forestry official to this effect.

SEC. 2. No Collector of Customs shall clear a vessel having on board forest products of any sort from any port of the Philippine Islands for a foreign port

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until the shipper of such products has complied with the provisions of Section 1 of this act.

SEC. 3. Every Collector of Internal Revenue and every Provincial Treasurer in the Philippine Islands shall make to the Chief of the Forestry Bureau an itemized monthly report of all moneys received by him for taxes on forest products, giving for each payment the date when made, the name of the payor, the number of the forestry official's order under which the payment is made, the nature of the product on which the payment is made, the name of the province in which it was taken and the amount of the payment.

* * * * * * *

Enacted, July 13, 1901.

[No. 218.]

AN ACT Creating a Bureau of Public Lands.

By authority of the President of the United States, be it enacted by the United States Philippine Commission, that:

SECTION 1. There is hereby created under the Department of the Interior an Insular Bureau of Public Lands which shall have charge of all the public domain of the government of the Philippine Islands, except so far as control thereof may be necessary to the functions of the Forestry and Mining Bureaus which shall not be affected by this act. Under the supervision of the Bureau of Public Lands shall be executed all instruments for the sale or conveyance of the public lands when authorized by law.

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Enacted, September 2, 1901.

[No. 527.]

AN ACT Amending the Municipal Code and the Provincial Government Act and the acts amendatory thereof, so far as concerns the collection and disbursement of internal revenue taxes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Section eighteen of Act Numbered Eighty-three, entitled "The Provincial Government Act," as amended by Act Numbered One hundred and thirty-three, entitled "An Act to amend the Provincial Government Act, Numbered Eighty-three," is hereby amended to read as follows:

"SEC. 18. In all provinces organized under this Act, the industrial tax, the stamp taxes, and all other taxes known as inland revenue taxes, except taxes on forest products from government lands, shall cease to be levied and collected as heretofore for the Central Government of the Archipelago from and after the thirtieth of June, nineteen hundred and one, and shall thereafter be collected as provincial and municipal taxes by the provincial and municipal treasurers, until such time as an internal-revenue law shall be enacted by the Commission. One-half of the taxes so collected shall be paid into the provincial treasury and the other one-half shall be paid into the treasuries of the respective municipalities in which they shall be collected. The treasurer of each province shall, either in person or through his deputies, or through the municipal treasurers of the province, collect, subject to the forestry regulations, the Government valuations on forest products from public lands, and each collector of internal revenue and each provincial treasurer in the Philippine Islands shall make to the Insular Auditor and to the Chief of the Forestry Bureau itemized monthly reports of moneys received by him from taxes on forest products, giving for each payment the date when made, the name of the payor, the number of the forestry official's order under which the payment is made, the nature of the product on which the payment is made, the name of the province in which it was taken, and the amount of the payment. All moneys received by any provincial treasurer or collector of internal revenue from taxes on forest products shall be covered into the Insular Treasury by him. Collections derived from forest products on Government land under the forestry regulations shall be

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regarded for the purposes of this section as collected in the province where the timber is cut or the forest products obtained, although actually collected at Manila or some other place. The net amount of the collections under the forestry laws made in the provinces and in the city of Manila shall be, after July first, nineteen hundred and two, returned pro rata to the provinces to which they respectively relate, after the entire expenses of conducting the Forestry Bureau and the service under its control shall have been deducted from the gross receipts. Such return shall be made as soon as the accounts of collections and disbursements shall have been settled and adjusted by the Auditor. Such returns of forestry collections to the provinces shall be made upon certification of the amount due by the Auditor, by settlement warrant, and for this purpose an appropriation of the sums so required in hereby made. One-half of all sums so returned to each province shall be covered into the provincial treasury and shall be available for all lawful provincial expenses. The remaining one-half shall be divided among the several municipalities from which came the forest products on which the original collections were made, pro rata to the amounts originally collected on products from each municipality. In the case of internal revenue collected in unorganized provinces and returned to them for disbursement upon organization, and in that of collections on forest products made at Manila where it is possible from the records in the office of the Acting Collector of Internal Revenue, the Forestry Bureau, and the provincial treasurer to determine to what municipality such funds belong, the provincial treasurer shall transfer such funds to the province, and if at any time the provincial treasurer shall ascertain to what municipality such funds were due he shall reimburse such municipalities for the amounts respectively due them from provincial funds. The stamps required by law for the collection of taxes shall be furnished to provincial treasurers by the Insular Treasurer, who shall obtain the same from the City Assessor and Collector of Manila in sufficient quantities for the purposes of this section, giving a proper receipt therefor. The provincial treasurer receiving the stamps shall rereceipt for the same to the Insular Treasurer. The Insular Treasurer shall render a monthly account-current to the Insular Auditor of the stamps furnished by him to provincial treasurers, supporting the same by proper vouchers. Provincial treasurers shall render for each month a report of stamps sold and stamps on hand to the Insular Auditor."

SEC. 2. Section ninety-seven of Act Numbered Eighty-two, entitled "The Municipal Code," paragraph (*c*) of section one of Act Numbered Three hundred and seventy-four amendatory thereof, and all other acts or parts of acts in conflict with the provisions of this Act, are hereby repealed.

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Enacted, November 19, 1902.

[No. 530.]

AN ACT Defining the jurisdiction of the civil and of the military authorities over lands reserved by the President of the United States for military purposes.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. No licenses shall be granted for the sale of or dealing in any intoxicating liquors on any public land reserved by the President of the United States for military purposes in the Philippine Islands.

SEC. 2. The military authorities shall have the right to reject any intruder or trespasser on any public lands reserved by the President for military purposes in the Philippine Islands, and to suppress open breaches of the peace and abate nuisances thereon.

SEC. 3. No branch of the Civil Government in force on or over any public lands reserved by the President for military purposes, and no civilian residents thereon, shall interfere with military administraton or the use of such lands for military purposes.

SEC. 4. The personal property of persons employed in the military service of the United States in the Philippine Islands and used by them incident to said service shall be exempt from all taxation under the laws in force in said Islands.

SEC. 5. No mining claims shall be located by any person on any public lands reserved by the President for military purposes in the Philippine Islands.

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SEC. 6. Every person who unlawfully cuts, or aids, or is employed in unlawfully cutting, or wantonly destroys, or procures to be wantonly destroyed, any timber standing upon lands of the United States, which in pursuance of law may be reserved or purchased for military purposes in the Philippine Islands, or removes any other public property, shall, upon conviction, be fined for each offense a sum not exceeding five hundred dollars, or be imprisoned for a period not exceeding twelve months, or both, in the discretion of the court.

SEC. 7. No arrest of any officer, soldier, or civilian employee, in the military service of the United States on any military reservation, camp, or barracks, shall be made except on warrant in due form in writing and served upon the commanding officer thereof.

SEC. 8. All laws or parts of laws in force in the Philippine Islands not inconsistent with military use of any public lands reserved by the President for military purposes shall be in full force and effect over said lands.

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Enacted, November 24, 1902.

[The Public Land Act—No. 926.]

SEC. 2 (see page 462)
SEC. 13 (see page 464)
SEC. 26 to 31 inclusive (see pages 466, 467)

[No. 1032.]

AN ACT Providing that the salaries of provincial and municipal officers and employees shall be fixed in Philippine currency at the same amounts now allowed by law to be fixed in Mexican currency, and that the assessment, imposition, and collection of taxes, public dues, and impositions now authorized and made payable by law in Mexican currency shall be made payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar, and that all compensation for insular or provincial officers and employees and all official fees and charges now made by law payable in Mexican currency shall be payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. All provincial treasurers, municipal councils, and other authorities of every kind in the Philippine Islands who have authority to fix the salaries of municipal officers and employees are hereby authorized and directed to fix such salaries in Philippine currency, instead of in Mexican currency, anything in existing law to the contrary notwithstanding. All such salaries heretofore fixed in Mexican currency shall, after January first, nineteen hundred and four, be payable in Philippine currency at the same amounts as now provided by law in Mexican currency, and shall remain fixed at such amounts in Philippine currency until changed by competent authority.

SEC. 2. On and after the first day of January, nineteen hundred and four, all public dues, internal revenues, industrial, stamp, forestry, cedula, license, and municipal taxes of every kind, and all fines and penalties imposed by courts or other authorities, shall be imposed, assessed, and collected in Philippine currency instead of in Mexican currency as now provided by law, and at the same amounts in Philippine currency as are now fixed by law for such taxes, fines, and penalties in Mexican currency: *Provided, however,* That Spanish-Filipino coins may be received in payment of such taxes, fines, and penalties at the official ratio that shall from time to time prevail until such time as Spanish-Filipino coins shall by law cease to be receivable for public dues.

SEC. 3. On and after January first, nineteen hundred and four, all compensation that is provided by law for Insular or provincial officers and employees, wherever such compensation is fixed in Mexican currency, and all official fees and charges, Insular, provincial, or municipal, wherever such fees are fixed in Mexican currency, shall be payable in Philippine currency on the basis of one Philippine peso for one Mexican dollar.

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Enacted, December 28, 1903.

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[Act. No. 1189.—The Internal Revenue Law.]

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SEC. 147. Of the taxes assessed and collected by virtue of the provisions of this Act the following shall inure to the Insular Treasury and be devoted wholly to the purposes of the Insular Government, except such portion thereof as is in this article set apart for the use and benefit of the provincial and municipal governments:

First. All stamp taxes.

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Tenth. All taxes on forestry products.

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SEC. 150. Ten per centum of all revenues accruing to the Insular Treasury by virtue of the provisions of this Act shall be set apart by the Insular Treasurer for the benefit of the several provincial governments for general provincial purposes, and said sum of ten per centum shall be apportioned among the several provinces in proportion to their respective populations as shown by the census of nineteen hundred and three. Fifteen per centum of all the revenues accruing to the Insular Treasury by virtue of the provisions of this Act shall be set apart by the Insular Treasurer for the benefit of the several municipal governments for general municipal purposes in accordance with law, and said sum of fifteen per centum shall be apportioned among the several municipalities in proportion to their respective populations as shown by the census of nineteen hundred and three: *Provided*, That of the fifteen per centum of the revenue set apart by this section for the benefit of the several municipal governments, one-third thereof shall be utilized solely for the purposes of the maintenance of free public primary schools in the respective municipalities, including the payment of teachers, the building of schoolhouses, and other expenditures appertaining to the maintenance of the public schools. For the purposes of this Act the city of Manila shall be deemed as a municipality and as a province, so that in the apportionment to the several provinces and municipalities it shall receive on a basis of twenty-five per centum. The distribution of funds to the provinces and municipalities under this section shall be made once every three months, beginning with the first day of January, nineteen hundred and five.

SEC. 151. Wherever in this Act it is prescribed that a duty shall be performed by the provincial treasurer and his deputies, the duty so imposed on the provincial treasurer and his deputies shall be performed in the City of Manila by the City Assessor and Collector and his deputies.

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Enacted July 2, 1904.

[No. 1544.]

AN ACT Exempting from internal revenue taxes all timber and other forest products for use in the actual construction and equipment of certain railway lines in the Philippine Islands.

By authority of the United States, be it enacted by the Philippine Commission, that:

SECTION 1. Timber and other forest products of all kinds, to whatever group they may belong, when cut or gathered under proper licenses issued by the Bureau of Forestry for use (and which shall, in fact, be so used) in the construction and equipment of the railways undertaken by the grantees under Acts Numbered Fourteen hundred and ninety-seven and Fifteen hundred and ten, pursuant to authority conferred by said Acts, shall be exempt from all internal revenue taxes prescribed by Act Numbered Eleven hundred and eighty-nine, as amended, upon the presentation to the Collector of Internal Revenue, or his authorized agent, of a certificate in writing, in the form to be prescribed by the Collector of Internal Revenue, and signed by the representative or duly authorized agent of the railway company purchasing the timber or other forest products. The certificate shall show, in substance, that the material for which this exemption is sought is to be used in the construction and equipment of a line of railroad between certain points, naming the same; that no other use or disposition of the material will be made or permitted; and that if any other use or disposition thereof shall be contemplated, immediate notice thereof shall be given to the Collector of Internal Revenue, and the material in question to be held subject to his order.

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SEC. 2. The exemptions provided by this Act shall not be construed to extend or apply to materials of any kind purchased from funds other than those of a railway company mentioned in section one hereof, or of one of its contractors or subcontractors, nor to materials which are intended for the personal use of officers or employees of any such company, contractor or subcontractor, whether the same are purchased from funds of such company, contractor, or subcontractor or not.

SEC. 3. The provisions of this Act shall not apply or extend to any railway line, nor to any materials therefor, after the line shall have once been officially declared to be constructed and equipped.

SEC. 4. Any company or corporation violating any of the provisions of this Act or any of the terms of the certificate prescribed in section one hereof shall be punished by a fine of not less than double the amount of the taxes provided by law upon the timber or other forest products which may be the subject of the violation, and not more than ten times the amount thereof in the discretion of the court; any officer, representative, agent, or employee of any company or corporation, or any other person, violating any of the provisions of this Act or any of the terms of the certificate prescribed in section one hereof shall be deemed guilty of a misdemeanor, and shall be punished by imprisonment for not less than one nor more than six months or by the fine above prescribed, or both, in the discretion of the court.

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Enacted, October 18, 1906.

[No. 1407—Reorganization Act.]

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SEC. 9. (*a*) The Bureau of Forestry shall have one chief, who shall be appointed by the Governor-General, by and with the consent of the Philippine Commission, and who shall be known as the Director of Forestry. The Director of Forestry shall perform the duties now imposed by laws in force on the Chief of the Bureau of Forestry, and such other duties as may be required of him by this Act as Director of Forestry. The Salary of the Director of Forestry shall be eight thousand pesos per annum.

(*b*) (*As amended by Act No. 1800*). For the period of five years from the date of the passage of this Act any resident of the Philippine Islands may cut or take, or hire cut or taken, for himself from the public forests, without license and free of charge, such timber, other than timber of the first group, and such firewood, resins, other forest products, and stone or earth, as he may require for housebuilding, fencing, boat building, or other personal use of himself or his family. Timber thus cut without license shall not be sold nor shall it be exported from the province where cut, except as hereinafter authorized: *Provided*, That the Director of Forestry, with the approval of the Secretary of the Interior, may set aside for the use of the inhabitants of any municipality, township, or settlement a suitable tract of forest, which shall be known as a communal forest, and the privilege of cutting, taking, or hiring cut or taken from the public forest without license and free of charge such timber other than timber of the first group, and such firewood, resins, other forest products, and stone or earth, as any resident of the municipality may require for housebuilding, fencing, boat building, or other personal use of himself or his family, shall then be exercised only within the communal forest thus set aside. Such communal forests shall be on lands more suitable for forestry than for agriculture. They shall be administered by the Director of Forestry, subject to the approval of the Secretary of the Interior, in such a way as to assure the people having rights therein of a continued supply of forest products necessary for their home use, and to this end the Director of Forestry may prescribe the species and sizes of trees that may be cut and the manner of removal of such trees or other forest products, stone, or earth. When there is no public forest land conveniently situated within the limits of a province to which any municipality, township, or settlement belongs, and when such public forest land exists in a neighboring province, it may be set aside as a communal forest for such municipality, township, or settlement, and timber cut in it without a license may then be exported from such communal forest to the municipality, township, or settlement in question. Exploitation of a communal forest for revenue shall be allowed only when the best interest of such forest demands cutting in excess of

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local needs. Such exploitation for revenue shall be carried on under license in the same manner and subject to the same conditions as in public forests. On satisfactory showing that a resident of any municipality, township, or settlement for which a communal forest has been set aside will erect a house of strong materials the Director of Forestry may issue or cause to be issued to such resident a written permit for the cutting within such communal forest of the requisite amount of first-group timber without charge, and such cutting shall then be lawful. Subject to the approval of the Secretary of the Interior, the Director of Forestry may issue rules for carrying out the provisions of this paragraph, and such rules may provide for the suspension or withdrawal from any person of the free-use privilege herein provided as a punishment for the violation of the Forest Act, as amended, the forest rules, or of the provisions of this paragraph and the rules promulgated hereunder.

Dealers in forest products, stone, or earth taken from the public forests shall pay the charges prescribed in article fourteen of Act Numbered Eleven hundred and eighty-nine, entitled "The Internal Revenue Law of Nineteen hundred and four," on all such products taken by them. Every person, firm, or company whose business it is to sell timber or other forest products, stone, or earth shall be regarded as a dealer in such products within the meaning of this Act.[a]

(*c*) The functions heretofore performed by employees of the Bureau of Forestry and by presidents of municipalities or settlements, in measuring and manifesting timber or other forest products, stone, or earth taken from the public forests, in fixing the Government charges to be paid thereon, and in collecting delinquent taxes thereon, shall be discharged hereafter by employees of the Bureau of Internal Revenue under such rules and regulations as the Director of Internal Revenue may prescribe and the Secretary of Finance and Justice approve.

(*d*) Unless otherwise provided by this Act, the Bureau of Forestry, in addition to the duties and services required by this section, shall perform the duties and render the services now prescribed by law for the Bureau of Forestry.

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Enacted Oct. 26, 1905.

Opinions of the Attorney-General.

MILITARY AND NAVAL RESERVATIONS; APPLICATION OF PHILIPPINE FORESTRY LAWS.

MANILA, *December 2, 1905.*

SIR: Pursuant to your indorsement upon the attached papers, I have the honor to render an opinion upon the question whether the Philippine forestry laws are applicable to lands within the military and naval reservations.

The question of the jurisdiction of the civil authorities and the operation of the laws of the Philippine Commission over lands reserved for military and naval purposes was fully discussed in my opinions dated September 9, 1902, and September 13, 1902, published in Volume I, Opinions of the Attorney-General, pages 326 and 332, respectively.

I do not deem it necessary to review the authorities therein cited, but shall merely reaffirm the conclusions therein reached, namely, that the Philippine Commission unquestionably has authority to enact general laws extending over the military and naval reservations in the Philippine Islands. These opinions are in conformity with the views of the Secretary of War and the Judge-Advocate-General of the Army, as shown by the cablegram of the Secretary of War to the Governor-General, dated at Washington, December 22, 1904, in which he uses the following language:

"The theory that the President by the establishment of a military or naval reservation withdraws the reserved lands from the operation of the local law is erroneous. The Commission may find it conducive to the efficient administration in some cases to vest certain powers in the military or naval authorities of such reservations, but the powers so conferred should be exactly defined and strictly limited by statute."

The Forest Act, No. 1148, was enacted by the Commission on May 7, 1904. The purpose of said act, as stated in its title, is to regulate the use of the *public forests* and *forest reserves* in the Philippine Islands. Said act has been amended by section 9 of Act No. 1407, but the amendments do not affect the question here presented.

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[a] See Sec. 12, page 581.

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Section 2 of said Forest Act provides:

"The *public forests* and *forest reserves* of the Philippine Islands shall be held and administered for the protection of the public interests, the utility and safety of the forests, and the perpetuation thereof in productive condition by wise use; and it is the purpose of this act to provide for the same."

Section 3 of said act provides:

"The *public forests* shall include all *unreserved public lands* covered with trees of whatever age."

Section 4 of said act provides:

"Upon the recommendation of the Chief of the Bureau of Forestry, with the approval of the Secretary of the Interior, the Civil Governor may set apart *forest reserves* from the public lands, and he shall by proclamation declare the establishment of such reserves and the boundaries thereof, and thereafter such *forest reserves* shall not be entered, sold, or otherwise disposed of, but shall remain as such for forest uses, and shall be administered, except as provided in this section, in like manner as the public forests under this act: *Provided*, That the Civil Governor may in like manner by proclamation alter or modify the boundaries of any forest reserve from time to time, or revoke any such proclamation, and upon such revocation such forest reserve shall be and become part of the public lands as though such proclamation had never been made."

From the title of said act and from its provisions it appears to have been the intention of the Commission that it should apply only to *public forests* and *forest reserves* in the Philippine Islands as those terms are defined or described in said sections 3 and 4 of the Forest Act.

It is clear that military and naval reservations are not "forest reserves" within the meaning of that term as it is described and used in the Forest Act. Whether lands within the bounds of military and naval reservations are included within the term "public forests" depends upon the meaning to be given to the words "unreserved public lands" as used in said section 3 of the Forest Act.

The words "public lands" are habitually used in our legislation to describe those lands belonging to the Government which are subject to sale or other disposition under general laws. (See Newhall *vs.* Sanger, 92 U. S., 761.)

Laws relating to public lands do not extend to lands which have been previously appropriated or preserved for special uses, unless they are specifically mentioned in the law itself; and whenever a tract of land has been once legally appropriated to any purpose, from that moment the land thus appropriated becomes severed from the mass of public lands; and no subsequent law or proclamation with reference to the public lands shall be construed to embrace it or to operate upon it. (See Wilcox *vs.* McConnel, 13 Pet., 498, 513; 28 Am. & Eng. Enc. of Law, pp. 222–223, and authorities cited.)

In the case of the United States *vs.* The Tygh Valley Land and Live Stock Company (76 Fed., 693, 694) the court said:

"There is a clear distinction between public lands and lands reserved from sale and other disposition under general laws; such a reservation severs the lands so reserved from the mass of the public domain, and appropriates it to a public use. * * * The reservation of the lands in question is an appropriation to a special public use and is, therefore, a disposal of them so far as the public domain is concerned."

The supreme court of Utah, in the case of The United States *vs.* Elliot (26 Pac. Rep., 1118), held that a reservation of lands for school purposes for the use of the people of a Territory or State is, in effect, a grant, and that the title passes as soon as the lands are surveyed.

It is a rule in the construction of statutes, that where the legislative branch of the Government has reproduced language in statutory enactments which has been judicially construed, it must be taken as using the words in accordance with the judicial construction previously given them, unless a contrary reason plainly appears from the other language used. (The Abbotsford, 98 U. S., 440; United States *vs.* Elliot, 26 Pac., 1118.)

I am, therefore, of the opinion that the words "*unreserved public lands*," as used in section 3 of said Forest Act, must be literally construed, and that they refer to lands belonging to the Government not appropriated or reserved for any special use, but are subject to sale or other disposition under the general land laws; that all public forests must be public lands; that the military and naval reservations, having been previously reserved for special uses, are not public lands, and for that reason can not be public forests, within the meaning

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of those words as used in the Forest Act. Hence, the provisions of said act are not applicable to any lands reserved for military or naval purposes or for any other special public use whatsoever.

Section 6 of Act No. 530 was evidently enacted by the Commission with a view to the protection of growing trees and timber on military reservations. Said section is as follows:

Every person who unlawfully cuts, or aids or is employed in unlawfully cutting, or wantonly destroys, or procures to be wantonly destroyed, any timber standing upon lands of the United States which in pursuance of law may be reserved or purchased for military purposes in the Philippine Islands, or removes any other public property, shall, upon conviction, be fined for each offense a sum not exceeding five hundred dollars or be imprisoned for a period not exceeding twelve months, or both, in the discretion of the court.

Very respectfully,

L. R. WILFLEY, *Attorney-General.*

The SECRETARY OF THE INTERIOR.

The Forest Regulations.

These regulations are established in accordance with the provisions of The Forest Act (No. 1148).

I. (*a*) Forest reserves differ from public forests in that the former are exempt from entry (except for mining claims) and sale.

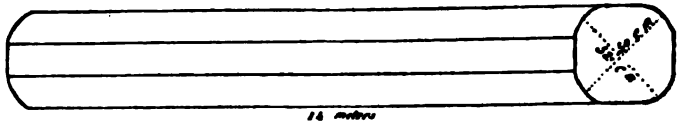
(*b*) Licenses will be issued for the cutting, collection, and removal of forest products from forest reserves. The operations of licenses on forest reserves will be subject to the constant and personal supervision of the officers in charge.

II. (*a*) Land will be considered more valuable for agricultural than for forest purposes if worth more per acre cleared than are land and trees together when not cleared.

(*b*) Persons who desire to enter agricultural land in any public forest, in accordance with the provisions of section seven of The Forest Act, must, before making such entry, obtain from the Chief of the Bureau of Forestry, a certificate setting forth that said land is more valuable for agricultural than for forestry purposes and is not required by public interests to be kept under forest. Blank forms of application for such certificate will be supplied by the Bureau of Forestry on request.

III. Sites for sawmills or timber depots not exceeding four hectares in extent may be leased to holders of timber licenses for periods of not more than twenty years, under such property terms, not inconsistent with the provisions of section nine of The Forest Act, as may be deemed reasonable by the Chief of the Bureau of Forestry, approved by the Secretary of the Interior, and included in each instance in the lease. Blank forms of application for such leases may be obtained from the Bureau of Forestry.

IV. The volume of approximately octagonal logs (four sides being hewn and the other four unhewn) will be ascertained by multiplying eight-tenths of the square of the average diameter connecting the two pairs of opposite unhewn sides of the smaller end and multiplying the result by the length.



Example: Average diameter between opposite unhewn sides of smaller end, 51 centimeters; length, 14 meters. $.51 \times .51 \times .8 \times 14 = 2.923$ cubic meters.

V. In the measurement of a log having an eyehole, or a rope hole in one end, the length taken will be the distance from such hole to the more distant end of the log: *Provided*, That if such hole be more than thirty centimeters from the nearer end of the log, thirty centimeters only will be deducted from the full length of the log in estimating the length for the purpose of determining its cubic contents.

VI. The volume of pieces of timber which come to a point or nearly to a point at one end, will be determined by multiplying the square of the average diameter by eight-tenths and the result by the length; one-half of the diameter of the large end will be considered the average diameter.

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VII. Pieces of wood more than one and one-half meters in length and fifteen centimeters in diameter will be designated as timber.

VIII. In determining the Government charges on minor forest products other than firewood—i. e., charcoal (carbon vegetal), gums (gomas and gutapercha), resins (almaciga and breas), wood oils (balao), dyewoods (sibucao, maderas, tintoreas), dyebark (nigue), and tanbark (cascalote)—the actual value at the market nearest the forest where the product is gathered will be taken as the "actual market value." The following weights and measures will be used in manifesting such minor forest products:

The metric quintal for gums, resins, and dyewoods.

The liter for wood oils.

The cubic meter for charcoal.

Tanbark and dyebark will be estimated by the thousand pieces, provided that where the pieces are not of uniform size or are so small as to make their counting burdensome, the metric quintal may be used.

GENERAL PROVISIONS RELATIVE TO LICENSES.

IX (*a*) Licenses issued under the provisions of The Forest Act will entitle the holders for certain fixed periods of time to enter upon definite tracts of public land and obtain therefrom, under conditions stated in the licenses, the material designated therein, but will not convey any further right or authority.

(*b*) Licenses to cut, collect, and remove timber, firewood, gums, resins, or other forest products from public forests and forest reserves will, with the approval of the Secretary of the Interior, be granted by the Chief of the Bureau of Forestry: *Provided*, That special authority to grant licenses for small amounts of forest products may be given by the Chief of the Bureau of Forestry to foresters, assistant foresters, inspectors, and assistant inspectors. They will be of the following four general classes:

(1) *License agreements*, which will provide for the exclusive privilege of cutting, collecting, and removing forest products for a period not to exceed twenty years over areas of public forest larger than those granted in ordinary licenses.

These agreements will provide certain conditions, limitations, and restrictions, including a minimum amount of timber to be cut during the first year, and methods of cutting and hauling the same to prevent undue injury to the forest, responsibility of agents and employees, and the charges to be collected on forest products.

(2) *Miners' licenses*, which will provide for the cutting, collecting, and removing of timber from the public forests or forest reserves for use in developing the mines mentioned in the licenses. The timber so cut to be paid for at one-half the ordinary Government charges on such timber.

(3) *Gratuitous licenses*, which will provide for the cutting, collecting, and removing of forest products from public forests and forest reserves free of charge. Such licenses may be granted under certain conditions, restrictions, and limitations to needy residents, miners, or to officials for use in public works.

(4) *Ordinary licenses*, which will provide for the cutting, collecting, and removing from public forests and forest reserves of forest products on which the full charges prescribed in section 12 of The Forest Act are due.

(*c*) Every license issued will be delivered to the licensee attached within the covers of a book containing a copy of The Forest Act, of these regulations, and of any special rules applicable to said license, together with lists of the forest reserves and of protected areas, and such other information as may be deemed of value by the Chief of the Bureau of Forestry.

(*d*) In granting licenses covering given forest tracts or other tracts in their immediate vicinity, preference will be given to persons to whom licenses have previously been granted and who have obeyed the law and regulations and have aided in protecting the forests; to residents of municipalities or settlements in which the timber or other forest products to be collected are situated; to applicants for small amounts of timber or other forest products for their own immediate use; and to persons or associations of persons contemplating the employment upon a considerable scale of modern machinery and logging methods.

(*e*) Licenses will ordinarily be granted for a period of one year, except in cases where special cause is shown for granting them for a longer period.

(*f*) The number of licenses granted in each province will be limited, and will depend upon the forest conditions in the province and the needs of the people.

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(*g*) No license will be granted except upon the express condition that the licensee assumes responsibility for all the acts of his agents.

APPLICATIONS FOR LICENSES.

X. (*a*) Applications for licenses must be made on official forms, which will be furnished on request by an executive officer of the Bureau of Forestry or by the Chief of the Bureau, and must contain the following information:

(1) The class of license desired.

(2) The kinds and amounts of timber or other forest products applied for.

(3) The name, age, citizenship, residence, and occupation of the applicant.

(4) A statement of former licenses granted to him or to any corporation, partnership, or association of persons with which he has been connected.

(5) The amount of forest products gathered under last license granted applicant, if any.

(6) Facilities for logging.

(7) Amount of capital applicant has available and purposes to employ in operations under the license if granted.

(8) Applicants for gratuitous licenses must state in detail the use to be made of the forest products for the taking of which a gratuitous license is requested, and any person making use of such forest products other than that stated in the license will be proceeded against under the provisions of section twenty-nine of The Forest Act.

(9) Applications for gratuitous licenses to cut timber for public works must be forwarded by the local forest officer to the office of the person, if any, discharging the duties of provincial supervisor for the province in which the forest products for the taking of which license is requested are situated.

(10) Residents of Manila who desire licenses to gather forest products in the provinces may file their applications in the Manila office.

(11) When application is made for a license by an incorporated company, a certified copy of the articles of incorporation must be submitted with such application.

LICENSE AGREEMENTS.

XI. (*a*) A license agreement will be granted only for territory where extensive cutting, extending over a period of years can be allowed and where logging operations can be personally supervised by forest officers. A minimum annual cutting will be required, the amount so required to be cut depending upon the forest conditions in the territory covered by the license and the extent of the territory. Should the amount of timber cut be less than that prescribed in the license agreement, the Chief of the Bureau of Forestry may reduce the area of timber land covered by the license.

GRATUITOUS LICENSES.

XII. (*a*) Gratuitous licenses will be granted as follows:

(1) A private gratuitous license for a needy resident will be issued only upon the certification of his need by the president of the municipality or settlement in which the applicant resides, or upon that of the local forest officer, and upon the sworn agreement by such applicant that he will employ the timber or use the forest products for which he applies solely for his own use and benefit and will not sell the same or dispose of it in any other manner than that authorized in the license. A private gratuitous license may be granted for not more than thirty cubic meters of timber of the second, third, or fourth groups. The amount of timber granted by gratuitous license to a needy resident will depend to some extent upon the abundance of bamboo in the vicinity of the applicant's residence.

(2) A public gratuitous license for timber to be used in public works, entitling the holder free of charge to take such amount of timber as may be needed in the public works desired.

(3) Miner's gratuitous license. (See Regulation XIII.)

(*b*) If any person holding an ordinary license cuts or removes timber from public forests or forest reserves for a person holding a gratuitous timber license, such ordinary license may be forfeited. A gratuitous license will not be issued to a holder of an ordinary license of the same class. Holders of gratuitous licenses are prohibited from giving away or selling any wood or other forest products cut thereunder. Wood or other forest products cut must be used for the purpose specified in the license and should there be any surplus the regular Government charges may be collected thereon.

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(c) Should any person holding a gratuitous license for cutting or gathering forest products for his personal and exclusive use, or for public works, gather a greater quantity than is allowed by the license, or take different classes from those specified, or apply them to different objects from those stated in the license, such products will be considered as taken without a license, and the offender will be compelled to pay thereon the charges prescribed in section twenty-five of The Forest Act.

MINERS' LICENSES.

XIII. A miner's timber license or a miner's gratuitous license will be granted in accordance with the provisions of section seventeen of The Forest Act upon application by the holder, locator, owner, lessee, or operator of a mining claim who submits satisfactory evidence of registration of the claim on which he proposes to use the timber. Timber cut by miners in violation of the Forest Act, forest regulations, instructions or orders of forest officers may be considered as cut without license and charged for at double the full Government rate.

FORFEITURE OF ORDINARY TIMBER LICENSES.

XIV. Holders of ordinary timber licenses will be allowed four months' time within which to begin operations. At the expiration of that period, persons who have taken no advantage of their licenses may, unless good reason be shown, have them forfeited because of such failure to take advantage thereof. In the event of such forfeiture, applicants for timber licenses who are on the waiting list will be notified that they may renew their applications. Forest officers will report monthly on the report of utilization of forest products (Bureau of Forestry Form 17) the names of all holders of ordinary timber licenses who have not made use thereof during the month for which the report is made.

TRANSFER OF LICENSES.

XV. (a) Licenses of all classes may be transferred by authority of the forest officer granting the same, or by that of the Chief of the Bureau, after the person to whom the license is to be transferred has furnished to the officer empowered to make the transfer the information which would be required were he making an original application for a license of the same class. No other mode of transfer will be authorized.

(b) After June thirtieth, nineteen hundred and five, every holder of a license will be required to perform, himself, or through his duly authorized agents or employees, all operations in the forest under the license which he holds. Failure to comply with this regulation may subject the offender to forfeiture of his license.

FIREWOOD FOR HOUSEHOLD USE.

XVI. Firewood may be taken from public forests and forest reserves without license by residents of the vicinity for their own household use.

PRIVATE WOODLANDS.

XVII. (a) The issuance by the Bureau of Forestry of a license to cut or utilize timber or other forest products from public forests or forest reserves does not authorize the gathering of such products from private lands, or from lands claimed as private lands unless specifically authorized in the license.

(b) Registration of titles in this Bureau as provided in section twenty-four of The Forest Act is not necessary in order to protect private lands from licensees claiming the right to cut on public lands. Any such licensee who cuts timber on private lands belonging to another, even though such lands are not registered in this Bureau, may have his license forfeited.

XVIII. Applications for registration of titles to private woodlands must be made on forms which may be had on application at any station of the Bureau of Forestry, and each such application must be accompanied by a map showing approximately the extent and boundaries of the parcel or parcels of alleged private lands containing forest products which it is desired to remove. Each such application and map will be filed in the Bureau of Forestry and evidence of title will be returned to the owner after inspection and report on the lands is made by the local forest officer.

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XIX. (*a*) Before removing forest products from registered private woodlands, the owner or administrator of the same must secure a manifest as provided in Regulation XXII, paragraph (*k*). He will also present to the proper forest or municipal officer, at the time the statement of forest products is presented for inspection, a receipt or certified copy of a receipt from the Bureau of Forestry showing the proper registration of title to such private woodlands. Any person who fails to so present a proper receipt and manifest will be proceeded against under the provisions of sections eight and thirty of The Forest Act.

(*b*) Forest products from private woodlands which are not to be removed from the premises of the owner but are to be used thereon, may be cut and gathered without charge on such private woodlands without registering title thereto in the Bureau of Forestry.

THE CUTTING, COLLECTING, AND REMOVAL OF FOREST PRODUCTS.

XX. (*a*) If a holder of a license cuts or collects forest products in a forest area other than that specified in his license, the products so cut or collected will be considered as taken without license.

(*b*) All timber selected for felling under any license should be taken from the forest. When timber has been so selected, no nonselected timber may be cut in the forest area covered by such license. If nonselected timber is taken from an area in which timber has been selected, it will be considered as taken without license and charged for accordingly.

(*c*) Holders of licenses must exercise particular care in cutting, working up, collecting, or transporting timber, firewood, or other forest products to avoid killing or injuring young trees less than forty centimeters in diameter or seedlings, especially those of the first and second groups. Such young trees of the first and second groups must not be cut for use in logging. As the future supply of the forest depends upon preserving young trees of valuable species, failure on the part of the holder of a license to exercise reasonable care to avoid the destruction of such young trees or seedlings may be followed by the forfeiture of his license.

(*d*) The holder of a timber license of any class may, when the permission of the Chief of the Bureau of Forestry is specifically given in his license, work up the tops of any trees cut for timber into firewood and market the same, free of all Government charges, under such special regulations as the Chief of the Bureau of Forestry in his license may prescribe and the Secretary of the Interior approve.

(*e*) The Chief of the Bureau of Forestry, in granting any timber license, may require as a condition of granting such license, that the holder shall work up and remove the tops and large branches of trees felled by him.

(*f*) The height of the stump of any tree cut for timber or firewood must not exceed the diameter of the tree on the stump.

(*g*) The diameter limit of trees allowed to be cut in any given forest area will vary in accordance with the species of the tree, the condition of the forest, and the requirements of each locality. In general, unless there is specific reason for fixing a specific size, no tree less than forty centimeters in diameter on the stump may be cut for timber, and trees cut for firewood should be at least twenty-five centimeters on the stump.

(*h*) Whoever fells undersized trees, or trees the felling of which is prohibited by these regulations or special orders, will be considered as cutting without a license and will be compelled to pay the regular charges thereon and the additional charge prescribed in section twenty-five of The Forest Act.

(*i*) The felling in the public forest or forest reserves of trees from which valuable gums, resins, or oils are extracted will not be allowed.

(*j*) The gathering of forest products not specially mentioned in these regulations will be authorized by license containing such special conditions as the Chief of the Bureau of Forestry may, after investigation, deem advisable, and the Secretary of the Interior approve.

(*k*) Round timber forty centimeters or more in diameter at the larger end, and squared timber twenty-two centimeters or more in width or twenty-two centimeters or more in thickness at the larger end will be considered of legal size. Timber of the first group or less than legal size must not be felled, unless such timber has been selected for felling by duly authorized forest officers, provided that these regulations shall not apply to ebony and lanete.

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(*l*) Timber used for levers, skids, parts of timber slides, or otherwise employed in logging, must be of the fourth group, unless proper timber of this sort is wholly wanting within a reasonable distance. Timber so used and left on the ground will be charged for, if of the third group, at the regular rate; if of the second or first groups, at twice the regular rate.

(*m*) The holder of a license for cutting timber or firewood must advise the local forest officer of the time when and the place where the cutting under such license will begin, and of the places where the wood cut will be piled. Felled timber must be piled in a clear place, in such a manner that measurement thereof may be readily made. The holder of a license must also notify the local forest officer of the names and residences of his representatives, if any. In the event of failure to so notify the proper officer, the products so cut, collected, or removed will be considered as taken without license.

(*n*) When the cutting or gathering of forests products under any license has been finished, the holder of the license must in writing notify the nearest forest officer of the place where such products are deposited, the classes and amounts of the same, and their destination. He must also state whether he has left any felled timber or any standing selected timber in the area covered by his license, and if so, he must state the amount and classes of such felled or selected timber left in the forest. Any person who fails or unreasonably delays to give such notice may be punished as provided in section twenty-nine of The Forest Act.

(*o*) Timber cut under a license and not removed from the forest within the period covered by such license will be charged for at the regular rate.

(*p*) Firewood, except when worked up from tree tops, as provided in section twelve of The Forest Act and in Regulation XX (*d*) and (*e*), must be of the third or fourth groups, and if woods of the first or second groups are taken as firewood, the same must be paid for as timber at double the Government rate for timber of these groups.

(*q*) Wood cut for burning into charcoal must be of the third or fourth groups, and the unauthorized use of woods of other groups for this purpose will subject the holder of the license to payment for the same as timber at double the Government rate for timber of such groups.

(*r*) All wood employed in the manufacture of charcoal must be paid for before it is burned. After felling trees and before commencing the process of burning for charcoal, the holder of a license must present to the local forest officer, or, in his absence, to the president of the municipality or settlement within which the wood is being piled, an itemized statement of the timber felled and must state where it is being piled. This statement will be verified and the wood valued by such officer or president; payment will be made and manifest will be issued as prescribed in Regulation XXII, paragraphs (*b*), (*f*), (*h*), and (*s*). After making the payment ordered, the holder of a license may proceed with the burning, but he must exercise care to avoid injury to standing timber, and if any damage results to such timber from his burning operations, said damage will be estimated by the local forest officer and payment therefor will be enforced in accordance with the provisions of the last paragraph of section twenty-five of the Forest Act.

GUMS, RESINS, AND WOOD OILS.

XXI (*a*) In extracting gums, resins, wood oils, and similar forest products, the holder of a license must make the cuttings or incisions into the trunks of the trees at least twenty-five centimeters above the ground. These incisions should be made with a very sharp instrument and may penetrate the bark and the first layers of sapwood only; they must not exceed twenty-five centimeters in length and must not penetrate the heart wood. When the flow of juice is obstructed at the outer edges of the incisions, the holder of a license will be permitted to recut these edges and to lengthen the cut by twenty-five centimeters, prolonging it upward, provided that the width of the incision shall never exceed eight centimeters. The making of incisions, or the trimming of the edges of incisions already made, or any lengthening of the same will not be permitted during the period from the flowering of the tree to the ripening of its seed. A metal or wooden plate may be placed at the lower part of the incision to facilitate the collection of juice. A vessel may be placed under the incision at the foot of the tree. Any holder of a license violating these provisions may have his license forfeited and must pay double the regular charge for timber on each tree so incised.

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(*b*) Gums, resins, wood oils, and similar forest products may be stored in municipalities, settlements, or other places, at the convenience of the holder of the license, after previous notification to the local forest officer, or in the absence of such officer, to the nearest local municipal authority of the place or places where such products are to be stored.

MANIFESTS.

XXII (*a*) Native forest products of all kinds will be presumed to belong to the Government until the contrary is proved.

(*b*) Before using, transporting, or disposing of any native forest product, the owner or his agent must obtain a manifest, authenticated by the local forest officer, provided that where no forest officer can be reached without undue hardship a duly authorized municipal officer may authenticate the manifest. In such cases if the product is to be transported by sea, the holder of a license will present a statement of the product in duplicate to the proper municipal officer, who will verify such statement and affix his seal or stamp of office, if any, and his signature thereto, forwarding one copy to the nearest forest station and returning to the holder of the license the other copy, which will be his authority to transport the product. If the product is to be transported by land or is for local use, the holder of a license in such cases will present a statement of the product in duplicate to the proper municipal officer, who will forward it to the local forest officer, who if it be impracticable for him to inspect the product, will appraise the same at his station and forward an order of payment to the proper municipal officer for delivery to the holder of the license. After payment has been made, the receipt will be forwarded to the local forest officer, who will issue a paid manifest to the party at interest, which will be his authority to dispose of the product. No charge will be made for making or authenticating a manifest. No manifest will be valid on which does not appear the signature of the forest officer or municipal officer duly authorized to sign manifests, and the signature must be accompanied by the stamp or seal of such officer if he has one.

(*c*) The holder of a license must not load, remove, sell, or use any forest product which has not been paid for, unless he has received express authority to do so from the Chief of the Bureau of Forestry and has given satisfactory guarantee to that official, except as provided in paragraphs (*b*), (*e*), and (*h*) of this regulation.

(*d*) When the holder of a license agreement or of an ordinary or miners' license has cut and piled his product, he must submit to the nearest forest station a statement of said product on Bureau of Forestry Form Thirteen and one-half, which will be furnished on application to any forest station. Upon receipt of this statement, the local forest officer will verify and appraise the product, taking the signature of the holder of the license on the manifest, which, when affixed, will be understood to indicate that the holder of the license approves the appraisement.

(*e*) If the product is to be transported by sea to another point in the Philippines, the holder of a license will have the option of paying the Government charges at the point of origin or at the destination of the product.

(*f*) In case the product is to be transported by sea to another point in the Philippines, and the holder of a license wishes to pay the Government charges at the point of origin, or in case the product is not to be transported by sea, the forest officer will issue an order directing the payment of the Government charges into the nearest provincial or municipal treasury or internal revenue office authorized to receive such payments.

(*g*) When the holder of a license presents his receipts of payment, the forest officer will take them up and mark the set of manifests paid, delivering to him the originals, which will be his authority to use, transport, or dispose of his product.

(*h*) In case the product is to be transported by sea to another point in the Philippines and the holder of the license wishes to pay the Government charges at the point of destination, the local forest officer will issue to him an unpaid manifest with a notation thereon to the effect that the product will be paid for at the point of destination. This manifest must be presented to the forest officer at the point of destination within five days after the arrival of the product; that officer will take up the manifest and issue an order of payment on which payment must be made by the holder of the license in the manner prescribed in paragraph (*f*) of this regulation, and the receipt of payment will be

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delivered to the forest officer, who will issue to the holder of the license or his agent an order allowing him to discharge the product. The product will be reappraised at the time of discharge, and the party at interest will be required to pay any excess which may be found upon reappraisement. In case the party at interest is satisfied with the reappraisement, he will sign the reappraisement sheets, the originals of which will be delivered to him.

(*i*) If, upon reappraisement at destination of the forest products manifested by a municipal officer, an excess of fifteen per centum or more shall be found over the amount manifested, the owner of the license or his agents will be proceeded against as provided in section twenty-nine of The Forest Act.

(*j*) When the holder of a gratuitous license has cut or gathered forest products, he will, before removing the same, submit a statement of the products to the nearest forest station on a form which will be furnished on application to such station. The local forest officer will take up this statement, verify it, and issue a manifest which will be the authority of the holder of the license to dispose of the products for the purpose specified in the license, provided that in case a forest officer can not be reached without undue hardship, the holder of a license may submit, in duplicate, a statement to the president of the municipality or settlement within which the products have been cut or gathered, which the president will verify, sign, and seal in duplicate, returning one copy to the party at interest and forwarding the other to the nearest forest station.

(*k*) All owners of private woodlands registered in the Bureau of Forestry in acordance with the provisions of section twenty-four of The Forest Act will, before removing forest products from such lands, proceed as prescribed in the previous paragraph for holders of gratuitous licenses.

(*l*) Forest products for export will be paid for before shipment, and the manifest must be presented to the collector of customs at the port of shipment. Any person violating this regulation will be proceeded against under the provisions of section thirty of The Forest Act.

(*m*) If at any time the party at interest should desire to detain a portion of a cargo or load of forest products which has been manifested, or divert a portion to some point other than that of original destination, the local forest officer will, upon application, make an entry of the facts at the foot of the original manifest, returning same to the party at interest, and issuing him in addition a new manifest to accompany the product detained or diverted. In the case of timber a line will be drawn through the entries on the original manifest of the pieces so detained or diverted.

(*n*) For identification of pieces belonging to different manifests, to aid in the recovery of lost timber, and to avoid fraud, the holder of a license will immediately after felling mark every piece of timber with his special mark which must be previously registered at the forest station. This mark will be indicated in the proper column of the manifest. The pieces of timber embraced in a manifest must also be numbered consecutively, beginning with one, and the corresponding numbers must be entered in the manifest under the proper heading. Where two different lots of timber for the same licensee are shipped on the same vessel, the pieces of the second lot must be marked "1A," "2A," and so forth.

(*o*) In all manifests of undersized timber, classified in the official tariff as belonging to the first group, except ebony and lanete (and camagon when stripped of its bark and sapwood), there should appear a statement by a ranger or president of a municipality or settlement as to whether such undersized pieces have been cut from trees of a diameter of forty or more centimeters as provided in Regulation XX, paragraph (*k*).

(*p*) Forest officers will, whenever practicable, mark with the official marking hatchet both ends of every log of timber manifested.

(*q*) Failure to present to the nearest forest officer manifests of forest products within five days of arrival at destination will, for the purpose of these regulations, be considered unreasonable delay in the making of a report; and failure to deliver or mail receipts of payment to a forest station or to a forest officer within seven days from date of payment will be considered an unreasonable delay in the making of a report.

(*r*) Any person found utilizing forest products in violation of section twenty-five or of section thirty of The Forest Act will be directed by the local forest officer to deposit the same with the nearest president of a municipality or

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settlement and an order of payment for the same, including the charges and additional charges provided in section twenty-five of The Forest Act, will be issued to him. Upon presentation of a receipt of payment to the local forest officer, the latter will issue a manifest to the party at interest, which will serve as an order on the municipal president for the release of the products and as an authorization for the party at interest to dispose of them.

(*s*) When a forest officer delivers an order of payment to a holder of a license or his agent, the latter will receipt therefor on the lower part of the original and duplicate. When impracticable to deliver an order of payment to the holder of a license or his agent, the same will be delivered to the proper municipal officer, taking his receipt in the manner above prescribed. The municipal officer will deliver the original to the holder of the license or his agent, causing him to receipt therefor with date of delivery, and advising the local forest officer of the date of delivery to the holder of the license or his agent, or when an order of payment is sent to a municipal officer for delivery to payor he will cause the order to be receipted for, by the licensee or his agent, with date of delivery, and advise the forest station as above.

(*t*) Each manifest of timber selected for felling by a forester will contain a certification to that effect at the foot of the original, duplicate, and triplicate manifests. Certification will also be made by foresters on manifests of firewood exempted from payment of Government charges under the provisions of paragraph eleven of section twelve of The Forest Act.

(*u*) Whoever, in violation of the provisions of The Forest Act or of these Regulations, discharges from any ship, boat, raft, car, cart, or any other means of transportation, forest products, or stone, or earth, or fails to pay the amounts due the Government on forest products, or stone, or earth, for a period of more than thirty days from the date of the receipt by him or his agent of the order directing the payment of the same, or transports or removes forest products, or stone, or earth without a manifest, unless he has received express authority to do so from the Chief of the Bureau of Forestry, will, in addition to the regular Government charges thereon, be subject to the payment of the sum of fifty per centum thereof, to be collected on an order of payment, in accordance with section thirty of The Forest Act.

AUCTION SALES.

XXIII. (*a*) When forest products, stone, or earth are sold at public auction under the provisions of section thirty-two of The Forest Act, within two days after such sale the local forest officer shall forward the duplicate manifest therefor to the Bureau of Forestry at Manila. He will file the triplicate at the forest station and deliver the original to the purchaser. On the original, duplicate, and triplicate manifests the proceedings of the sale will be noted and signed by the local forest officer and attested by the secretary of the municipality or settlement. The local forest officer will make out an order of payment equal to the amount of the bid, and upon presentation of the receipt of payment the manifest of the products sold will be marked paid and turned over to the purchaser, who may then take charge of and remove the products sold. The cost of seizure will include the cost of transporting the products to a secure place.

(*b*) If after sale there is a balance due the delinquent, the local forest officer will forward a certified copy of the manifest on Bureau of Forestry Form Thirteen and one-half to the collecting officer. Notation of said balance will also be made on the order of payment. If there is nothing due the delinquent, no manifest will be furnished the collecting officer.

(*c*) Before incurring any expense in transporting to a secure place forest products, stone, or earth, to be sold at public auction, the forest officer making the seizure will, if practicable, confer with the provincial supervisor or other public officer charged with similar duties and learn if he considers the products of sufficient value to warrant incurring the cost of transportation. When such unsold products are turned over to the supervisor or other public officer charged with similar duties, he will sign a receipt therefor on the bottom of the original, duplicate, and triplicate manifests.

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ABANDONED FOREST PRODUCTS.

XXIV. (*a*) All abandoned drift or stranded timber, firewood, bamboo, or other forest products will be considered the property of the Government unless the owner, if there be one, establishes his right and title thereto. Such products will be disposed of by the local forest officer as provided in Regulation XXIII for the public sale of forest products on which the Government charges have not been paid.

(*b*) If such products are claimed by more than one person the local forest officer may deliver the same to the person whom he deems entitled thereto, or may refer the claimants to the civil courts and deposit the product for safe keeping with the nearest president of a municipality or settlement pending the decision of such courts as to its disposal. Copies of all notices published and of all evidence of title to abandoned forest products will be kept on file at the local forest station. One copy of each such notice must be forwarded to the Chief of the Bureau of Forestry by the local forest officer, together with a memorandum of the action taken in the case by him.

CAINGINS.

XXV. (*a*) The clearing by fire of grass and brush land and of land in the public forest containing but little timber of inferior species, for the purpose of making "caingins," will be permitted in the following manner only:

Application will be made in writing to the local forest officer, or in his absence to the nearest president of a municipality or settlement, for permission to make a "caingin." The local forest officer, or if there is no local forest officer, a municipal officer designated by the president, will inspect the site of the proposed "caingin," and if satisfied that it can be cleared with fire without injury to adjoining public forests, will give written permission to make the clearing, stating the allowed limits thereof. He will instruct the person desiring to make such "caingin" relative to the proper measures to be taken to prevent fire from damaging adjoining property. If a "caingin" is authorized by a municipal officer, he must file with the local forest officer a report in duplicate of his proceedings, giving location and extent of the "caingin." The local forest officer must forward a copy of this report to the Chief of the Bureau of Forestry.

(*b*) In every case of violation of the provisions of section twenty-five of The Forest Act, the local forest officer will, if practicable, furnish the prosecuting officer with a detailed statement of the facts relative to such violation.

(*c*) Owners of private woodlands adjoining public forests and forest reserves will be permitted to make "caingins" thereon in the following manner: Before clearing the land by fire the owner must serve written notice of his intention upon the president of the municipality or settlement in which the land is situated, and upon the local forest officer, if any. Such notice must state the location and extent of the proposed clearing and the place of residence of the owner, and must be accompanied by some evidence of title to the land which it is proposed to clear. Copies of receipt for taxes upon such land for the preceding year will be accepted as evidence of title. Upon receipt of such notice, the local forest officer, or a municipal officer designated by the municipal president for this purpose, will visit the site of the proposed clearing and inspect the land. If satisfied with the evidence of title submitted and that the making of the "caingin" will not endanger adjoining public property, the forest officer or municipal officer will give written permission to make the proposed clearing. He will fully instruct the owner as to the proper measures to prevent the fire from damaging adjoining property. Copies of reports of proceedings relative to the making of "caingins" on private woodlands will be made and filed as prescribed relative to reports concerning "caingins" on public lands in paragraph (*a*) of this regulation.

(*d*) All fires employed in making "caingins" will, when practicable, be lit in the presence of the local forest officer or duly authorized municipal officer.

(*e*) The use of fire in felling timber or opening roads in public forests or forest reserves will not be allowed.

(*f*) Any person violating this regulation will be proceeded against under the provisions of section twenty-seven of The Forest Act.

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OFFICERS AND EMPLOYEES OF THE BUREAU OF FORESTRY NOT AUTHORIZED TO COLLECT MONEY.

XXVI. No money will be collected by any agent or employee of the Bureau of Forestry under any pretext whatsoever, nor will any charge, other than Government charges prescribed by law, be made for licenses, permits, papers, or services of any kind.

Notes.

Section 11 of The Forest Act prescribes the division of the native trees into four groups, the various provinces in the Philippine Islands into two classes, and the Government charges, as follows:

Native trees.

First group.	Second group.	Third group.	Fourth group.
Acle.	Alupag.	Agoho.	Anahao.
Baticulin.	Aranga.	Amuguis.	Anam.
Betis.	Banaba.	Anubing.	Apuit.
Camagon.	Bansalaguin.	Apitong.	Bacao.
Ebony.	Banuyo.	Batino.	Balacat.
Ipil.	Batitinan.	Bitanhol.	Balinhasay.
Lanete.	Bolongeta.	Catmon.	Batete.
Mancono.	Calamansanay.	Calumpit.	Bayoc.
Molave.	Calantas.	Cupang.	Bonga.
Narra.	Dungon.	Dalinsi.	Bulao.
Tindalo.	Guijo.	Dita.	Lauan.
Yacal.	Macaasin.	Dungon-late.	Malaanonang.
	Malacadios.	Malacmalac.	Malabalac.
	Mangachapuy.	Malapapaya.	Malabonga.
	Palo Maria.	Malasantol.	Mangasinoro.
	Supa.	Mayapis.	Manicnic.
	Teak.	Nato.	Pagatpat.
	Tucan-calao.	Palosapis.	Pagsainguin.
		Panao.	
		Sacat.	
		Santol.	
		Tamayuan.	
		Tanguile.	

All nonenumerated timber will be subject to the charges on fourth-group trees.

Provinces.

Class A.		Class B.	
Abra.	La Laguna.	Albay.	Moro.
Bataan.	Nueva Ecija.	Ambos Camarines.	Negros Occidental.
Batangas.	Pampanga.	Antique.	Negros Oriental.
Benguet.	Pangasinan.	Bohol.	Nueva Vizcaya.
Bulacan.	Romblon.	Cagayan.	Paragua.
Capiz.	Rizal.	Isabela.	Samar.
Cavite.	Sorsogon.	Lepanto-Bontoc.	Surigao.
Cebu.	Tarlac.	Leyte.	Tayabas.
Ilocos Norte.	Union.	Masbate.	
Ilocos Sur.	Zambales.	Mindoro.	
Iloilo.		Misamis.	

Charges per cubic meter of timber in provinces in Class A:		Charges per cubic meter of timber in provinces in Class B:	
First-group trees	₱5.00	First-group trees	₱2.50
Second-group trees	3.00	Second-group trees	1.50
Third-group trees	1.50	Third-group trees	1.00
Fourth-group trees	1.00	Fourth-group trees	.50

Sections 3569 and 3570 of the Revised Statutes of the United States read as follows:

"SEC. 3569. It shall be lawful throughout the United States of America to employ the weights and measures of the metric system; and no contract, or dealing, or pleading in any court, shall be deemed invalid or liable to objection because the weights or measures expressed or referred to therein are weights or measures of the metric system.

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"SEC. 3570. The tables in the schedule hereto annexed shall be recognized in the construction of contracts, and in all legal proceedings, as establishing in terms of the weights and measures now in use in the United States, the equivalents of the weights and measures expressed therein in terms of the metric system; and the tables may lawfully be used for computing, determining, and expressing in customary weights and measures the weights and measures of the metric system."

* * * * * * * * * *

A meter is equal to 39.37 English inches.

A cubic meter is equal to 1.308 cubic English yards, or 35.316 cubic English feet.

A liter is equal to 1.0567 liquid quarts.

A kilogram is equal to 2.20462 pounds, avoirdupois.

A quintal is equal to 220.46212 pounds, avoirdupois.

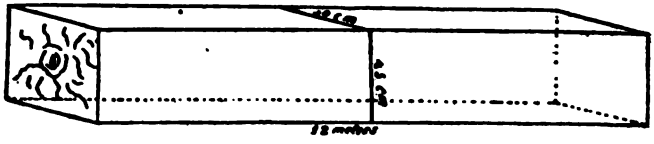
* * * * * * * * * *

The volume of all timber in accordance with the provisions of section twelve of The Forest Act will be determined as follows:

Round timber.—Multiply the area of the smaller end by the length of the log.

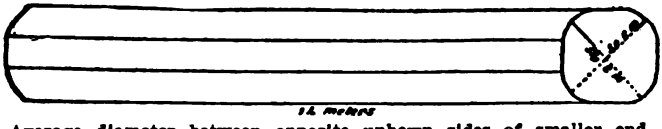
Example: Length, 10 meters; circumference of smaller end, 90 centimeters or .90 meters. .90×.90×.08×10=.648 cubic meters.

Square timber.—Multiply the average cross section by the length, to which twenty-five per centum shall be added for loss in squaring.



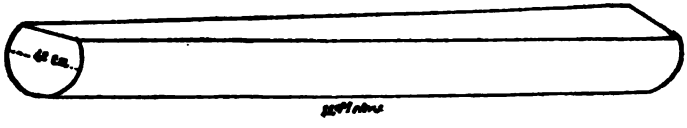
Example: Width of average cross section, 50 centimeters; thickness of average cross section, 45 centimeters; length, 12 meters. .50×.45×12=2.7 cubic meters. 25 per cent of 2.7=.675. 2.7+.675=3.375 cubic meters.

The volume of approximately octagonal logs (four sides being hewn and the other four unhewn) will be ascertained by multiplying eight-tenths of the square of the average diameter connecting the two pairs of opposite unhewn sides of the small end by the length.



Example: Average diameter between opposite unhewn sides of smaller end, 51 centimeters; length, 14 meters. .51×.51×.8×14=2.913 cubic meters.

Logs having one hewn side, multiply eight-tenths of the square of the diameter by the length.



Example: Diameter, 42 centimeters; length, 11.4 meters. .42×.42×.8×11.4=1.608 cubic meters.

The volume of all sawn timber will be determined, as provided in paragraph eight of section twelve of The Forest Act, by multiplying the average cross section by the length, to which fifteen per centum shall be added for loss in sawing.

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In the measurement of a log having an eyehole or a ropehole in one end, the length shall be the distance from such hole to the more distant end of the log; provided, that if such hole be more than thirty centimeters from the nearer end of the log thirty centimeters only shall be deducted from the full length of the log in estimating the length for the purpose of determining its cubic contents.

No charge will be imposed for making out applications for licenses, nor for the certification or signature of the president of a town or settlement, or other person who forwards applications for licenses.

Native tree species.

Scientific name.	Common name.	Group.
Afzelia bijuga	Ipil	First.
Afzelia rhomboidea	Tindalo	First.
Alstonia macrophylla	Batino	Third.
Alstonia scholaris	Dita	Third.
Anisoptera thurifera	Lauan	Fourth.
Anisoptera vidaliana	Mayapis	Third.
Artocarpus cumingiana	Anubing	Third.
Bauhinia sp	Bonga	Fourth.
Buchanania florida	Anam or Balinhasay	Fourth.
Calophyllum inophyllum	Palo Maria	Second.
Canarium sp	Bulao	Fourth.
Canarium sp	Pagsainguin	Fourth.
Casuarina equisetifolia	Agoho	Third.
Cedrela toona	Calantas	Second.
Cynometra sp	Batete	Fourth.
Dillenia philippinensis	Catmon	Third.
Diospyros discolor	Camagon	First.
Diospyros piloanthera	Bolongeta	Second.
Dipterocarpus grandiflorus	Apitong	Third.
Dipterocarpus polyspermus	Tanguile	Third.
Dipterocarpus vernicifluus	Panao	Third.
Dipterocarpus sp	Banuyo	Second.
Euphoria cinerea	Alupag	Second.
Gmynosporia ambigua	Tamayuan	Third.
Heritiera littoralis	Dungon-late	Third.
Homalium luzoniense	Aranga	Second.
Hopea plagata	Yacal	First.
Illipe betis	Betis	First.
Iteadaphne sp	Malabonga	Fourth.
Jambosa sp	Macaasin	Second.
Koordersiodendron pinnatum	Amuguis	Third.
Lagerstroemia batitinan	Batitinan	Second.
Lagerstroemia speciosa	Banaba	Second.
Litsea perrottetii	Baticulin	First.
Livistonia merrillii	Anahao	Fourth.
Maba buxifolia	Ebony	First.
Mimusops elengi	Bansalaguin	Second.
Myristica sp. ?	Malacadios	Second.
Palaquium tenuipetiolatum	Manienic	Fourth.
Palaquium sp	Malacmalac	Third.
Parkia roxburghii	Cupang	Third.
Pithecolobium acle	Acle	First.
Polyscias sp	Malapapaya	Third.
Pterocarpus indicus	Narra	First.
Pterospermum diversifolium	Bayoc	Fourth.
Rhizophora mucronata	Bacao	Fourth.
Sandoricum indicum	Santol	Third.
Sandoricum vidalii	Malasantol	Third.
Scolopia ?	Bitanhol	Third.
Shorea guiso	Guijo	Second.
Shorea malaanonan	Malaanonang	Fourth.
Shorea sp	Mangasinoro	Fourth.
Shorea sp	Palosapis	Third.
Sindora wallichiana	Supa	Second.
Sonneratia pagatpat	Pagatpat	Fourth.
Sterculia sp	Nato	Third.
Sterculia sp	Tucan-calao	Second.
Tarrietia sylvatica	Dungon	Second.
Tectona grandis	Teak	Second.
Terminalia calamansanai	Calamansanay	Second.
Terminalia catappa	Dalinsi	Third.
Terminalia edulia	Calumpit	Third.
Terminalia nitens	Sacat	Third.
Vatica mangachapoi	Mangachapuy	Second.
Vitex littoralis	Molave	First.
Wrightia ovata	Lanete	First.
Xanthostemon verdugonianus	Mancono	First.
Zizyphus zonulatus	Balacat	Fourth.
(?)	Apuit	Fourth.
(?)	Malabalac	Fourth.

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List of important Philippine woods arranged in the order of quantity received in the market for the fiscal years 1900–1901, 1901–2, 1902–3.

No.	Tree species.	Relative order, fiscal year—			Total amount cut, three years.
		1900–1.	1901–2.	1902–3.	
					Cubic feet.
1	Lauan	1	1	1	1,461,788
2	Apitong	4	2	2	963,469
3	Guijo	2	4	3	609,715
4	Molave	10	3	4	555,276
5	Yacal	15	7	5	307,798
6	Narra	13	5	6	280,773
7	Tanguile	20	6	7	256,156
8	Sacat	12	11	9	177,837
9	Ipil	26	12	8	176,580
10	Dungon	5	9	11	175,223
11	Malasantol	3	14	12	168,436
12	Supa	7	8	15	167,736
13	Balacat	8	13	14	133,597
14	Macaasin	6	25	10	133,521
15	Calantas	11	15	16	117,721
16	Tindalo	22	19	13	109,763
17	Balinhasay	21	23	21	92,861
18	Malaanonang	35	16	18	91,632
19	Amuguis	17	32	17	88,981
20	Malabonga	19	18	26	85,635
21	Mangachapuy	24	20	24	84,929
22	Acle	34	24	20	82,082
23	Bacao	30	10	37	80,903
24	Calumpit	23	34	19	78,821
25	Betis	33	21	22	76,765
26	Palosapis	25	17	28	75,169
27	Bansalaguin	14	35	25	74,342
28	Dalinsi	18	27	29	70,478
29	Nato	27	22	31	67,459
30	Malabulac	16	26	35	66,307
31	Panao	9	36	32	64,726
32	Palo Maria	36	29	23	62,862
33	Cupang	28	30	30	56,557
34	Banaba	37	33	27	50,425
35	Batitinan	32	23	34	47,904
36	Aranga	31	31	36	43,198
37	Banuyo	29	37	33	39,413

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EXTRACTS FROM REPORTS ON FORESTRY AND LUMBER

[Extract from]

IMPORTANT PHILIPPINE WOODS

By Capt. G. P. AHERN, 1901.

CHAPTER II.

State Forests.

From various sources of information I am led to believe that the public forest lands comprise from one-fourth to possibly one-half of the area of the Philippine Islands, viz: from 20,000,000 to 40,000,000 acres. There are fully 5,000,000 acres of virgin forest owned by the State in the islands of Mindoro and Paragua. The island of Mindanao, with an area of more than 20,000,000 acres, is almost entirely covered with timber, there being but a small percentage of cultivated land. In the province of Cagayan, on the island of Luzon, there are more than 2,000,000 acres of forest. In the places just mentioned the cuttings up to the present date have been very small. In many other provinces in the island of Luzon, especially in the country close to Manila, much timber has been cut; and to fill large contracts the lumbermen are obliged to go quite a distance from this city in order to find a suitable tract. In a recent visit to the southern islands of this group, I was impressed with the amount of timber standing on the smaller islands; frequently the topography was such that it could be exploited with facility. I saw tracts of virgin forest where more than 10,000 cubic feet of magnificent timber per acre was standing: trees 150 feet in height, with trunks clear of branches for 80 feet. There are many millions of cubic feet of timber in these forests that should be cut in order to properly thin out the dense growth: for instance, where there are three or four trees growing on a space required by one, that one so freed would put on more good wood each year than the four together. Forestry is largely a question of light and shade; it is comparatively easy to learn the most desirable tree species for a certain locality, but the question whether 300 or 3,000 trees should remain on one acre is where the real value of the scientific forester is shown.

There are 396 tree species mentioned in the present forestry regulations. We know of 50 more growing in these islands, and from time to time we learn of still other species. It is safe to state that the number of native tree species found will be nearer 500 than 450, a great majority of these undoubtedly being hard woods. The edges of the great forests have been scarcely cut away and 50 valuable hard woods are given to the world, the full value of which species has not been demonstrated as yet. Six hundred and sixty-five native tree species now listed.

There are a great variety of valuable gum, rubber and gutta-percha trees, but the trade has been ruined by the Chinese in their efforts at adulteration and other fraudulent practices.

We have a list of 17 dye woods, the revenue from which, if properly exploited, should pay the cost of the forestry service.

A book has been written by Tavera on the medicinal qualities of the native plants, many trees being mentioned as possessing valuable qualities.

The ylang-ylang tree abounds here, its blossoms producing an oil which is the base of many renowned perfumes. Quite a revenue is gained by owners of these trees.

The west slope of the island of Romblon is a mass of cocoanut palms from the water's edge to the mountain top, every tree bringing in a yearly revenue

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of from $1 to $2, and, when it is realized that several hundred such trees may be grown on an acre, one is struck with the wisdom of that former commander at Romblon who insisted upon such extensive planting of this species. In all parts of the southern islands these trees seem to grow without any effort or care.

Southern Paragua and Mindanao are celebrated for the great variety of gum, rubber, and gutta-percha trees grown there, but these forests have never been properly exploited, and afford a very attractive field for the investigator.

The following commercial uses of the above-mentioned tree species over such an extensive area give some idea of the great forest wealth of the Philippine Islands. Other uses will undoubtedly be discovered as investigation continues.

These forests produce: Timber and firewood; resin, gums and gutta-percha; textiles from seed, bark and trunk fibers; oils, including perfume essence, etc.; dyes; bark for tanning; sugar and fermented beverages; medicines; fruit and other food.

It will be the aim of this bureau to collect all data of interest connected with our forests. Specimens of woods will be added to those now on hand, and their uses and beauty shown as far as practicable. Investigators will be assisted and encouraged by this bureau to explore and report upon different features of the forest wealth of the islands.

Means of Communication.

There are no forest roads or river driveways in the islands that are worth mentioning. It will be impossible to exploit these forests until roads are constructed, rivers improved and harbors provided. The methods at present are exceedingly slow and expensive. The tree is felled far from any road, is hauled out very slowly by one or more carabaos, many tracts being left untouched, due to the difficulty of the haul and the lack of roads. The natives are not skilled lumbermen, and, while paid but a small wage, are by no means cheap labor when we consider the cost of felling and hauling a cubic foot of timber to the shipping point.

The most interesting statistics from foreign forestry reports are those published in Germany, showing the increase in the value of forest lands as the character of the roads improves. Good stone roads have made the German forest lands worth to-day, on an average, $181 (gold) per acre, and these same lands with standing timber less in quantity and quality than we find at present on many large areas in these islands. There will be some difficulty in the construction of roads in such places as Cagayan, Mindoro and Paragua, but these difficulties can be overcome. Stone is plentiful and available, but labor is scarce, and such as we have is poor and uncertain. This latter will be the one great difficulty. When the labor problem is solved, engineers and money will build roads that will make the Philippine forests yield a revenue that is undreamed of to-day by the residents of these islands.

Lumbermen contemplating extensive operations, after solving the labor problem, must next consider the roads and driveways. The main roads should be built by the State with a view to the gradual betterment of the tributary forests. For several years the efforts of the forestry service should be directed to a judicious thinning of the dense jungles where an axe has never been heard, many varieties of undesirable tree species should be cut away and the dense growth thinned out. The State and lumbermen should work together; after the first roads are started the lumbermen can figure on the possibilities of the first forests so tapped. There are no pure forests of any one tree species; dozens of varieties grow in each forest, but there are rarely more than three or four trees of one variety found grouped together, so that any lumbermen looking for a shipload of any one species would find it impossible to cut that and no other, but would be obliged to procure the same by purchase from men operating in different sections. Lumbermen must be willing to take dozens of varieties of tree species.

Markets.

There is a great demand in Manila, in fact all through the Orient, for construction timber; the demand will continue, as many important public works are in contemplation in the Philippines, many private enterprises will make demands, thousands of houses must be built, and when the present condition of these islands and the vast amount of work to be done are considered, it would

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be difficult to foretell when the present high prices for timber will materially lessen. There are very few lumber companies here properly equipped to handle large logs; it will take companies contemplating such work many months to establish themselves, to secure labor and transportation to deliver their first cargo; and if such companies are not prepared to furnish master mechanics, expert gang bosses, in fact all the skilled labor required, with a full stock of the best supply material, it would be hazardous to attempt to move the large logs which must be cut and brought to market if these forest tracts are exploited properly. It has been the custom by loggers in many parts of these islands to leave the large trees and cut smaller trees so that now in many of the Philippine forests we find only very large trees and very small ones.

Labor.

Much has been said against the native as a laborer, but as a matter of fact the Filipino and Moro have worked well, and are working well. The native must be treated considerately, he should receive his full wage and not be kept in debt for years, receiving in lieu of pay a few yards of calico and a few pounds of rice at fancy prices. We read much of the heavy losses sustained by advancing wages to native laborers; as a matter of fact the first advance of money is often a charge that should be met by the employer, and if not such a legitimate charge, is soon made up by profits on the necessaries of life sold to the native. In Mindanao, where an American officer has a number of Moros employed, the first wages were paid daily, then by the week. The astonishment of these natives at receiving real money was amusing to the officer; in a very few weeks many of these same workmen, having satisfied their first needs, requested permission and were allowed to deposit their pay with the officer. Such a spirit has been encouraged; it means much to such a community. These people no longer fear the tax gatherer, they can accumulate, become property holders, and then, staunch friends of law and order.

The Chinese coolies work well in the timber, but at present many are not willing to go far from the towns, being afraid of the ladrones and insurrectos. The native has been cutting and hauling timber to the railroad and water's edge recently for about 25 to 40 cents, Mexican, per cubic foot—that is the price paid to the headman of the native gang. The logs are hauled out by carabaos, usually on mud sleds; recently sixteen carabaos were hitched to one very heavy log which they hauled into a station on the railroad. The carabao is not very strong and succumbs quickly if worked hard. He is useful in the rice field and in swampy ground, but will not meet the demands of the American lumberman. Good roads, mules, portable railways, donkey engines, etc., with intelligent supervision, will go far toward making this vast timber wealth available.

The American lumberman can do it, but not until he has carefully investigated the conditions and is prepared to meet them. There are obstacles here which will paralyze the efforts of companies not fully prepared. This investigation and preparation will take time and should be made by practical men. A good price is paid at Hongkong for timber from the Philippines and Borneo and every stick of timber is eagerly bought up as soon as a vessel arrives. Although the prices in Manila are very high, not much Borneo timber is received here.

Prices.

High prices have prevailed in Manila ever since the American occupation, due to the scarcity of supply and to the great demand for timber by quartermasters, engineers, and Signal Corps, as well as by private parties.

As a rule timber is bought and sold by the cubic foot, occasionally the metric system is used; the loggers very often sell by the vara (33 English inches), that is, a log squaring 12 inches will sell at so much a vara in length, one 10 by 12 or 12 by 14 inches at so much a vara, etc.

In 1875 the prices for timber in Manila ranged from 25 cents per cubic foot for bancal, lanutan, paitan and many other species, to 50 cents and less for molave, narra, ipil, dungon, mangachupuy, acle, tindalo, yacal, baticulin, calantas and others. In 1897 the price in Manila for woods of the first and superior groups ranged from $1 to $1.50 per cubic foot; the second group, 65 cents to $1; third group, 50 to 75 cents; fourth group, 30 to 50 cents.

Since American occupation the prices for logs have been as follows: Superior group, $1.50 to $3 per cubic foot; first and second groups, $1 to $1.50 per cubic foot; third group, 60 cents to $1.50 per cubic foot.

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Very few woods can be bought in this market for less than $1 per cubic foot; the retail lumberman sells small lots of some species of the superior group as high as $4.50 per cubic foot.

Contracts have just been let for piles (first group timber), 30 to 50 feet in length, at $11.50 to $12 per pile. Telegraph poles cost $1.50 to $2 a piece, delivered at the railroad. All prices mentioned are in Mexican money.

At present, freight rates are very high and will probably remain so for a long time, as the increase of trade which will follow cessation of hostilities will be very rapid, making the question of transportation a very difficult one.

CHAPTER III.

List of Woods Described.

Acle.	Batitinan.	Ebony.	Molave.
Camphor.	Bayuco.	Guijo.	Narra.
Alintatao.	Betis.	Haras.	Palo-Maria.
Anagap.	Bitoc.	Ipil.	Panao-balao.
Anubing.	Calantas.	Lanete.	Supa.
Apitong.	Calamansanay.	Lanutan.	Tindalo.
Aranga.	Calumpit.	Lauan.	Tamauyan.
Amuguis.	Camagon.	Macaasin.	Tanguile.
Banaba.	Camuning.	Malaruhat.	Teca.
Bancal.	Dinglas.	Malatapay.	Urung.
Bansalaguin.	Ditaa.	Mancono.	Yacal.
Baticulin.	Dungon.	Mangachapuy.	
Batino.	Dungon-Late.	Mangasirique.	

* * * * * * *

CHAPTER IV.

The Anay, or White Ant.

"The white ant (termes), known here as "anay," is by far the most formidable insect in its destructive powers. It is also common in China. Here it eats through most woods (there are some rare exceptions, such as molave, ipil, yacal, etc.) and indeed some persons assert, although I am unable to confirm it, that even the surface of iron is affected by these insects if left long enough where they are. If white ants earnestly take possession of the woodwork of a building not constructed of the finest timber, it is a hopeless case. I have seen deal-wood packing cases eaten away so far that they could not be lifted without falling to pieces.

"Merchants' warehouses have had to be pulled down and rebuilt owing to the depredations of this insect, as even if the building itself were not in danger, no one would care to risk the storage of goods inside. The destruction caused by anay is possibly exaggerated, but there is no doubt that many traders have lost considerable sums through having to realize, at any price, wares into which this insect had penetrated."—*Foreman, p. 390.*

The following woods are not subject to attack by anay: Dinglas, ipil, molave and yacal.

Tindalo is attacked by anay when there is no other wood in the vicinity.

Baticulin is attacked by anay but is not damaged or destroyed, except such parts as are buried underground.

One hundred and twenty varieties of native woods and also woods from Borneo and America are being subjected to tests as to resistance to the white ant. These tests began December 1, 1900. A bulletin showing results will be issued this year.

TEST WITH THE WHITE ANT.

Mr. D. N. McChesney, master mechanic at the depot quartermaster shops in Manila, found last February that his trunk (made of an American spruce) had been invaded by white ants, and was almost entirely destroyed; the clothes contained in the trunk were also eaten. He placed the trunk on the ground and near it pieces of the following woods:

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Variety.	Result of thirty days' contact with ants.
AMERICAN WOODS.	
Oregon pine	Entered and eaten; a mere matter of time for complete destruction.
Bull pine	Eaten more readily than Oregon pine.
Spruce	Do.
Hemlock	Not touched.
California redwood	Ants tried, but discontinued after a slight effort.
California white cedar	Do.
NATIVE WOODS.	
Molave	Ate a little of it, deepest hole about one-fourth of an inch.
Narra	Ate a little of it, deepest hole about one-half of an inch.
Painted wood	Ants worked under paint and ate the wood readily.

CHAPTER V.

Strength and weight of woods.

List of hard woods arranged in order of their tensile and transverse strength.

[Foreman, p. 372.]

Tensile strain.	Transverse strain.	Tensile strain.	Transverse strain.
1. Dungon	Molave.	8. Acle	Banaba.
2. Yacal	Camagon.	9. Narra	Yacal.
3. Ipil	Ipil.	10. Tindalo	Mangachapuy.
4. Mangachapuy	Acle.	11. Molave	Lauan.
5. Guijo	Dungon.	12. Lauan	Guijo.
6. Banaba	Tindalo.	13. Cedar	Cedar.
7. Camagon	Narra.	14. Lanete	Lanete.

List of woods, arranged in order of their elasticity, resistance and specific gravity.

[Sebastian Vidal, p. 178.]

Elasticity.	Resistance.	Specific gravity.
Calantas.	Pagatpat.	Ebano.
Sulipa.	Bansalagin.	Camagon.
Antipolo.	Yacal.	Yacal.
Lanete.	Culing-manoc.	Pagatpat.
Anagap.	Manicnic.	Anusep.
Baticulin.	Ipil.	Manicnic.
Apiton.	Molave.	Dungon.
Amuguis.	Narra.	Molave.
Macasin.	Cubi.	Teca.
Bancal.	Guijo.	Tindalo.
Anubiong.	Acle.	Bolongita.
Marang.	Ebano.	Camayuan.
Calumpan.	Camagon.	Ipil.
Malaruhat.	Tindalo.	Pasac.
Calumpit.	Calamansanay.	Lanutan.
Banaba.	Calumpan.	Banaba.
Anusepmalatalan.	Anusep.	Cubi.
Malatalan.	Pino.	Culing-manoc.
Manicnic.	Palonapuy.	Mangachapuy.
Mayapis.	Panguisan.	Calumpang.
Acle.	Camayuan.	Panguisan.
Calamansanay.	Dungon.	Betis.
Narra.	Bolingita.	Acle.
Balao or Panao.	Mangachapuy.	Guijo.
Molave.	Betis.	Uncasin.
Guijo.	Lanutan.	Bansalaguin.
Palonapuy.	Antipolo.	Calumpit.
Tindalo.	Bancal.	Malatlan.
Cubi.	Balao or panao.	Calamansanay.
Yacal.	Malatlan.	Malaruhat.
Camaynana.	Nato.	Narra.
Santol.	Banaba.	Apiton.
Bolongita.	Tangile.	Pino.

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List of woods, arranged in order of their elasticity, resistance and specific gravity—Continued.

Elasticity.	Resistance.	Specific gravity.
Dungon.	Palo-maria.	Tangile.
Mangachapuy.	Macasin.	Antipolo.
Nato.	Malaruhat.	Anubiong.
Teca.	Pasac.	Malacadios.
Malacadios.	Mayapis.	Nato.
Panguisan.	Lanete.	Palo-maria.
Pino.	Santol.	Palonapuy.
Betis.	Anubiong.	Calantas.
Ipil.	Malacadios.	Amugius.
Ebano.	Anagup.	Bancal.
Camagon.	Calumpit.	Mayapis.
Bansalagui.	Apiton.	Baticulin.
Culing-manoc.	Baticulin.	Lanete.
Lanutan.	Calantas.	Anagap.
Pagatpat.	Marang.	Santol.
	Sulipa.	Marang.
		Sulipa.
		Balao.

Woods that last well in water.

Apiton.
Banaba.
Bancal.
Batitinan.
Betis.
Calantas.
Dinglas (used largely in naval construction.)
Dungon (especially durable in sea water.)
Ipil.
Acle.
Lauan (only for bancas).
Mangachapuy.
Molave.
Panao-Balao.
Tanguile (cascos and bancas).
Teak.
Tindalo.
Urung.

Woods that last well in the ground, with concrete next to wood.

Molave.
Dungon.
Ipil.
Antipolo.
Banuyo.
Guisihan.
Pasac.
Anubing.
Malaputat.

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"A visit to the Philippine Islands."—Bowring, 1876.

[Extract taken by him from a publication in 1858 by Col. Valdes.]

Names and uses.	Weight of cubic decimeter.	Resistance. Per cubic centimeter under pressure. With the grain vertical.	Resistance. Per cubic centimeter under pressure. With the grain horizontal.	Resistance. Tension or force of cohesion.	Maximum elasticity to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of square centimeter.	Resistance to bending (coefficient of fracture). Absolute strength.	Resistance to bending (coefficient of fracture). Applicable force.
	Kilo.	*Kilo.*	*Kilo.*	*Kilo.*		*Kilo.*		*Kilo.*	*Kilo.*
Acle: Plentiful in the islands; used for edifices and cascoes	1.12	498	340	490	1*l.* 1,000=0.001	49.0	49.130	140.0	14.00
Alintatao: There are various kinds, and is used for making furniture in Luzon and Visayas	.91	598	300	728	1*l.* 1,080= .0008	72.8	78.600	159.0	16.00
Alupag, or Alopai: Is used for supports and is plentiful	.92	666	220	1,242	1*l.* 1,443= .0307	124.2	179.230	178.2	17.82
Ambogues or Amoguis: Is very much subject to attack by anay; is used for planks and boards for flooring	.98	338	130	572	1*l.* 1,000= .001	57.2	36.362	165.5	16.55
Aninabla or Aninapla: Is used in building houses and boats; prized for its lightness and duration	.59	340	146	493	1*l.* 1,335= .00075	49.3	65.500	146.37	14.64
Anonang: The leaves are covered with worms; the wood is used for drums and musical instruments	.46	340	120	745	1*l.* 1,942= .0005	74.5	424.700	64.0	6.40
Anipolo: For canoes, floors, and machines; it gives a gum which is used for birdlime	.41	286	70	564	1*l.* 1,390= .00072	56.4	78.608	115.0	11.50
Balibago: Twine and paper are made from the bark, and powder from the charcoal	.46	616	200	1,180	1*l.* 924= .00108	118.0	108.000	165.0	16.50
Balete: The bruised roots are used to cure wounds	.40	498	176	1,345	1*l.* 2,008= .00049	134.5	270.000	89.1	8.91
Baticulin: White wood, for moulding and sculpture; very durable; abundant	.42	186	100	215	1*l.* 1,818= .00055	21.5	39.300	114.1	11.45
Banaba: Resists well the action of the climate	.65	348	126	904	1*l.* 1,242= .0008	90.4	112.300	166.0	16.60
Bancal: Strong and durable; it is used for furniture, flooring, boats, and barrels	9.58	220	66	470	1*l.* 148= .00071	47.0	65.500	763.7	7.64
Bitoc: Resists well heavy pressure	.71	338	100	1,010	1*l.* 700= .00148	101.0	68.250	216.4	21.64
Bolonguita: Strong for building purposes; plentiful	.90	360	120	858	1*l.* 917= .00109	85.8	78.600	153.0	15.30
Calamansanay: Used for flooring	.86	533	130	892	1*l.* 885= .00113	89.2	78.600	165.0	16.50
Calantas: It is found in all parts of the Philippines and is used for canoes and fine boxes	.40	470	60	517	1*l.* 1,515= .00066	51.7	78.600	108.2	10.82
Calumpit: For building; very strong wood	.60–.80	340	90	905	1*l.* 87= .00115	90.5	78.600	1,272.8	12.73
Camagon: With beautiful grain and spots; polishes well and is used for fine furniture	.92	558	340	752	1*l.* 952= .00105	75.2	71.472	172.0	17.20
Camayuan: It is used for house building	.94	434	340	493	1*l.* 333= .00075	49.3	65.500	166.0	16.60
Dongon: Fine wood for edifices; it is very plentiful	1.02	435	200	658	1*l.* 926= .00108	65.8	60.468	140.0	14.00
Ebano: Admits of a fine polish and can be beautifully worked	1.91	688	470	1,122	1*l.* 8= .00106	112.2	97.400	114.0	11.40
Guijo: Is plentiful and very highly prized; is used for keels of vessels and carriage wheels	.76	370	140	720	1*l.* 833= .0012	72.0	60.000	190.1	19.00
Lanete: Elastic and appropriate for furniture	.55	336	120	462	1*l.* 695= .00144	46.2	31.443	165.0	16.50
Lauan: Gives a resin used for incense; in former times used for vessels; plentiful	.43	226	90	694	1*l.* 1,031= .00097	69.4	71.742	76.4	7.64

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"*A visit to the Philippine Islands.*"—*Bowring, 1876*—Continued.

Names and uses.	Weight of cubic decimeter.	Resistance. Per cubic centimeter under pressure. With the grain vertical.	With the grain horizontal.	Tension or force of cohesion.	Maximum elasticity to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of square centimeter.	Resistance to bending (coefficient of fracture). Absolute strength.	Applicable force.
	Kilo.	*Kilo.*	*Kilo.*	*Kilo.*		*Kilo.*		*Kilo.*	*Kilo.*
Malacatbun: Very little used	.63	146	60	306	4*l.* 1,724= .00058	30.6	52.400	----------	----------
Malacintud: A strong wood; used for house building	.645	400	160	995	1*l.* 793= .00126	99.5	78.600	140.0	14.00
Malaouidondao: Makes strong futtock timbers in framing ships	.78	350	116	1,103	1*l.* 714= .0014	110.3	78.600	165.4	16.54
Malatalisay: Elastic and flexible; for naval construction	.50	300	60	498	1*l.* 500= .002	49.8	25.230	101.82	10.18
Malaruhat: Solid texture; uses not mentioned	.79	340	76	870	1*l.* 1,300= .00077	87.0	112.300	191.0	19.10
Malatapay or Mabolo: For furniture and edifices; it resembles ebony	.78	500	290	740	1*l.* 500= .002	74.0	39.300	146.4	14.64
Malabagat. For edifices, especially for pieces used lengthwise	.89	330	120	1,430	1*l.* 770= .0013	143.0	112.300	64.0	6.40
Manga: Variety of the manga of Cuba; on account of value of fruit wood little used	.58	380	166	910	1*l.* 989= .001	91.0	90.000	16.4	1.64
Mangachapuy or guison dilao: For vessels and flooring of buildings	.88	438	136	372	1*l.* 1,700= .306	37.2	62.887	165.0	16.50
Molave: Called "Queen of Woods" by natives; applied to all uses; resists action of climate, lime, and insects	.95–1.02	600	290	1,257	1*l.* 625= .0016	125.5	78.600	254.6	25.460
Narra, or naga, or asang: For edifices, furniture, doors, and windows	.66	500	200	633	1*l.* 833= .0012	63.3	52.400	127.3	12.730
Palo-maria or bitanhol: For masts, crosspieces, etc., of vessels	.68	400	126	950	1*l.* 926= .00109	95.0	87.350	134.0	13.400
Palma-brava or anajao: Strong and durable, especially in water; used for stakes	1.085	530	400	892	1*l.* 884= .00113	89.2	78.600	153.0	15.300
Palosapis: A strong wood; used for canoes and bancos	.50	440	146	870	1*l.* 1,243= .0008	87.0	108.000	89.0	8.900
Panao, or balao, or malapajo: For edifices and vessels; gives, upon incision, an odorous resin used by natives for illuminating purposes; used also for varnish	.69	393	149	800	1*l.* 1,125= .0009	80.0	90.000	101.8	10.180
Pencapencanan: Used generally for shoes and buoys	.46	378	106	972	1*ll.* 111= .0009	97.2	108.000	134.0	13.400
Pototan or bacao: For stakes, on account of its resistance to action of water	.69	420	146	1,780	1*l.* 1,517= .00065	178.0	270.000	153.0	15.300
Sampaloe or tamarindo: For tools and other purposes and for edifices	.62	320	90	846	1*l.* 934= .00107	84.6	78.600	121.0	12.100
Santol: Used for posts and pillars; not very plentiful	.46	630	----------	810	1*l.* 1,823= .0007	81.0	108.000	153.0	15.300
Tanguili: For edifices	.57	300	100	698	1*l.* 1,313= .00096	69.3	71.462	114.56	11.456
Tangan: For window frames, joists, etc	.65	330	60	658	1*l.* 756= .00135	88.5	65.500	114.56	11.456
Tindalo: For furniture; emits an agreeable smell	.89	450	106	470	1*l.* 1,042= .00096	47.0	49.130	165.5	16.550
Yacal: For shipbuilding, rafters, and joists	1.105	450	200	1,174	1*l.* 833= .0012	117.4	98.260	191.0	19.100
Ipil: Used generally for house building; is plentiful in Luzon	1.085	434	300	563	1*l.* 714= .0014	56.3	39.300	153.0	15.300

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	Traction.		Compression.		Flexion.		Torsion.		Resistance to cutting.	
	Limit of elasticity.	Rupture.	Limit of elasticity.	Absolute resistance.	Limit of elasticity.	Resistance.	Limit of elasticity.	Resistance.	Perpendicular to fiber.	Parallel to fiber.
Narra (red)	245	313	217	313	295	500	38	82	320	75
Pagatpat	200	688	248	450	183	476	35	58	298	33
Pasac	171	513	200	374	138	303	32	52	208	32
Supa	288	321	343	373	258	532	35	78	229	72
Solipa	125	238	188	248	282	329	33	51	172	44
Teca	354	638	243	368	288	590	43	96	392	83
Tindalo, or Batalayon	324	652	233	351	272	587	43	95	350	78
Tangile	285	348	313	317	250	584	48	78	300	75
Yacal	365	672	245	372	323	663	52	92	371	76
Ypil	193	638	241	357	128	382	34	53	295	35
Yamagua	100	413	198	283	71	200	23	51	201	31

	Cohesion.		Pressure.		Flexion.		Torsion.		Resistance to cutting.	
	Limit of elasticity.	Rupture.	Limit of elasticity.	Absolute resistance.	Limit of elasticity.	Resistance.	Limit of elasticity.	Resistance.	Perpendicular to fiber.	Parallel to fiber.
Acle	183	380	218	311	216	482	34	62	286	71
Antipolo	180	377	216	313	219	478	33	60	281	68
Amuguis	172	353	211	308	212	450	32	57	270	62
Apiton	166	335	208	300	207	444	30	52	261	60
Anuvion	180	387	228	344	232	481	35	54	290	65
Bansalagui	310	552	235	327	312	542	44	85	370	72
Bancal	280	383	218	245	213	418	32	74	198	73
Betis, or Azaola	339	657	253	385	388	652	52	101	398	78
Balao	230	301	210	284	275	443	34	78	180	72
Banaba (red)	346	670	273	400	338	698	52	103	387	79
Camunin	357	687	275	392	343	687	48	97	396	77
Cedro, or Calantas	172	513	212	350	130	300	30	52	215	33
Camagon	368	700	247	385	327	691	49	97	382	77
Calamansanay	304	483	222	301	257	513	31	77	208	70
Dungon	327	394	377	398	192	603	67	82	384	79
Dinglas	343	395	383	415	187	690	69	83	400	88
Ebano mulato	315	695	380	397	215	685	69	83	403	92
Guijo	320	380	374	427	175	622	68	80	298	82
Lanete	258	240	111	233	175	412	28	71	238	57
Lanutan	320	388	345	352	187	613	90	81	385	87
Malarujat	287	315	371	312	152	527	59	78	346	77
Malatapay	318	402	395	408	203	682	71	81	390	89
Molave	282	318	223	343	225	568	60	79	341	77
Manicnic	322	680	397	398	667	680	77	86	410	90
Mangachapuy	281	312	300	337	153	598	65	82	312	79
Macasin	292	325	327	343	155	568	60	77	341	69
Mayapis	213	454	221	395	137	309	33	50	283	44

Other woods mentioned.

[Salvador Ceron, Inspector General de Montes, 1889–1893.]

Acacia of 3 points.
Abeto.
Aliso.
Alerce of Alpes.
Algarrobo.
Abedul.
Acebuche.
Alcornoque.
Acana.
Alerce of Canada.
Aiti or Iti.
Almez.
Alamo (white).
Brasil (red).
Brasil sappan.
Balsamo.
Baria or ataje.
Balonguita.
Baldomero.
Carpe.
Cuvil.
Caoba.
Cucuyo.
Chicharron.
Culimg-manog.
Cerezo.
Castaño.
Cuaba.
Caimito.
Carne de doncella.
Cuero duro.
Dagame.
Enebro.

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Other woods mentioned—Continued.

Encina.
Ebano carbonero.
Fresno.
Granadillo.
Guayacan.
Guairaje.
Guayabo.
Haya.
Jucaro black.
Jaimiqui.
Jaguey.
Jigui de la ley.
Jiba.
Jaboncillo.
Leviza.
Mamey.
Majagua.
Malarigat.
Malabongo.
Malacadins.
Malatalisais.
Mangle (red).
Maboa de la Costa.
Monte-Cristo.
Moruro.
Maboa del interior.
Manianita.
Nogal.
Nato.
Olmo.
Palo mulato.
Palo diablo.
Pinabete.
Pinsapo.
Pino salgareño.
Pino carrasco.
Pino silvestre.
Pino de Escocia.
Pino pinonero.
Pino de la Florida.
Pino de America.
Pino negro.
Pino maritimo.
Pino or palo pino.
Pino de Canarias.
Palma real.
Palma brava.
Palo apuy.
Quiebra hacha.
Quejigo.
Roble comun.
Roble albar.
Roble pedunculado.
Roble melojo.
Raspa-lengua.
Sauce.
Serbal.
Sabucao.
Sabicu.
Santol.
Sigua.
Tamarindo or Sampaloc.
Tortuga.
Tilo.
Yana cuaba.
Yaiti.
Yana.
Yua.

CHAPTER VI.

Uses of woods.

WOODS MOST PREFERRED IN NAVAL AND ORDINARY CONSTRUCTION.

The woods most esteemed at present for export are the following:

In naval construction a wood should have, in addition to close and compact weight, a certain amount of elasticity and be easily worked, qualities which make the teak of Malabar so valuable.

Lloyd in his classification of woods has placed the molave, dungon, and betis in the highest class.

The following are preferred in China:

Futtock timbers (frames of vessels).—Molave and other similar woods. Futtock timbers should have a minimum length of 30 feet.

Stems, sternposts and stanchions.—Molave, dungon and analogous woods.

Beams and planks.—Mangachapuy, batitinan, banaba and others analogous and having close and compact pores and a certain elasticity and buoyancy.

Keels.—Betis and dungon.

Decks.—The Chinese prefer the North American pine. This affects very much the sale of malasinoro, lauan rojo and other similar woods. The pine from Puget Sound, Oregon, and other parts of the United States and also the peun of Singapore, which is our sambualan, is sold in Shanghai free of duty at .035 to .05 cents (Mex.) per square superficial foot, and 1 inch thick. At these prices it is impossible for us at present to compete in deck timbers.

In ordinary construction the woods generally used are bansalaguin, macasin, calumpit, guiji, pagatpat, malatumbaga, supa (sold under the name of ipil), ipil (known as black ipil), malasinoro (passed as mangachapuy), mangachapuy (passed in China as white molave), acle (very similar to the teak, jungle teak of Singapore and Borneo), maladungon, balaon and apiton rojo, these three being prized as piles, mulamgat, malauin aso (passed as molave), yacal (called there "gray molave"), bulobog (sold as apitong), sandano (passed as molave), bancalanag, duca, calamansanay and some others.

From the above it will be seen that exporters pass off woods of an inferior quality for those of a higher grade, thus discrediting the superior woods. Notwithstanding this the Chinese never buy wood by invoice and attach little importance to names. Their methods of buying are very crude, the principal factors of importance to them are, that the wood does not float, and that it is of a dark color, when as a matter of fact many of the Filipino woods of the first-class, when well seasoned, float; the question of color is of little or no importance. Their methods of buying is by inspection, cutting the wood with an axe and

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examining it; the woods which they prefer are the molave, narra, bansalaguin (highly prized), yacal, dungon, supa, tindalo, betis, mangachapuy, camagon, acle and ipil. There are others which have little or no value in the Philippines, being subject to attacks by the anay, woods which should find a ready sale and be well appreciated in northern China and Japan, where this destroyer, termis dives, is unknown.—*Domingo Vidal, p. 202.*

List of the principal woods of the Philippines arranged according to uses.

[Sebastian Vidal, pp. 179–180.]

FOR CABINET MAKING.

For fine furniture.—Ebano, camagon, bolongita, tindalo, narra, malatapuy, alintatao, camuning.

For ordinary furniture.—Lanete, narra blanca, lanutan, malaruhat, antipolo.

FOR NAVAL CONSTRUCTION.

Keels, stern-posts.—Yacal, betis, dungon, ipil.

Futtock timbers, sterns, knees.—Molave.

Outside construction, beams.—Banaba.

Beams, masts.—Guijo.

Keelsons, sleepers—Batitinan.

Waterways, decks.—Mangachapuy.

Superstructure, inside divisions.—Amuguis, of mariveles.

Futtock timbers, masts.—Palo-maria.

The frigate *Esperanza*, built at Cavite Arsenal in 1834, and which still has her woodwork in perfect condition, is testimony of the great superiority of the Philippine woods in ship building.

CONSTRUCTION OF CANOES (BANCAS).

Tangile, lanuan, malaanonang, balao, mayapis, and many others less used. Quick grower.

FOR HOUSE CONSTRUCTION.

Molave.—Pillars, joists and window and door and other frames.

Ipil.—Same uses.

Supa, balao.—Substitutes for ipil, but are inferior.

Dungon.—Pillars, sills, dormers, etc., especially used for pieces required to resist much pressure, and which do not need to be finely finished, for it is not easily worked.

Banaba.—It is employed in many different kinds of pieces. Moisture affects it very slightly.

Yacal.—Excellent for rafters and other pieces. Those of large dimensions are becoming scarce; nevertheless, there are some twelve meters long by 0.20 to 0.25 meters square.

Amuguis, bataculin, malatumbaga.—Generally sawed into planks and used for partitions, ceilings, etc.

Calantas.—For special line of boxes for superior class of cigars.

FOR ORDINARY BOXES.

Tangile, mayapis, malaanonang, and many others of many classes, easy to saw and very plentiful.

1. Curved pieces 15 to 20 meters long, 0.23 to 0.30 wide and 0.45 thick.
2. Of short duration; did not last ten years in the canoneras.—*S. Vidal.*

Many of the Philippine hard woods considered of no value here on account of the insects, climate, etc., would find favor in America where such enemies would not be encountered. Many such woods are strong, of fine grain, take a high polish and are excellent material for fine furniture.

Uses of various classes of timber.

Pillars or harigues.—Molave, ipil, and anobin; the latter must be thoroughly free of sap or white wood, which is attacked by white ants. Acle also is used for harigues.

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Beams on the pillars to receive rafters.—Dungon and yacal, which are notable for resisting great transverse pressure, and attacks of white ants.

Joists, rafters, etc.—Yacal, banaba, batitinan, macasin, ipil and dungon; latter two knds are rather heavy for roof work.

Flooring.—Banaba, guijo, mangachapuy, macasin, tindalo, supa and calamansanay.

Partitions.—Banaba, bancal, guijo, calantas, mangachapuy, etc.

Tabla din-din or outside planks of houses.—Molave, narra, acle.

Window frames.—Molave.

Doors.—Narra, cedar.

Ceiling.—(Cedar calantas) Baticulin, anagap, mangachapuy.

Rafters, joists, flooring.—Aranga.—*Laguimanoc, 10th December, 1888. H. G. Brown.*

CHAPTER VII.

Gutta-percha in Mindanao.

"The Father Missionaries of the Company of Jesus have just written the Father Professor of natural history in the Municipal Atheneum of Manila, giving an interesting account of the new industry of procuring gutta-percha in that island.

"Father Bofill under date of December 23, writes: 'During the past three months, the tirurayes (tamontaca), near Cotabato, have been actively engaged in extracting in the forests Fequet, a spècies of gum, from the fefedus tree. They fell the tree and make perpendicular cuts along the trunk, and collect in large leaves the juice which exudes.

"'At first they sold this gum to the Chinamen at $3 and $4 a pico, but now they get $30 for it; it is really worth $70 in Europe.

"'I advise you of this that you may know what a useful product this is, and the facility with which it can be extracted; it is a great pity that the trees are destroyed.

"'Many people are engaged in this industry and they are now extracting the gum from the trees in the forests of Dulanganas. It is also said to exist in the island of Bongao.'

"Father Sancho adds in a letter from Zamboanga, dated December 26: 'It has just come to my knowledge that my parishioners of Santa Maria have discovered a new gum, so valuable as to be worth $25 a pico. I will try to procure a good sample and send it to you.'

"The word gutta-percha is of Malay origin and signifies gutt, gum, percha, Sumatra; i. e., gum of Sumatra.

"It belongs to the sapotaceæ and to the genus isonandra.

"Mr. Robert Wright in his 'Illustrations of Indian Botany,' says, in Volume II., XCVIII, Sapotaceæ: 'There are two species of isonandra; one grows in the forests, the other in the foothills of the mountains. Gutta-percha is the most highly prized of all, among the products of the sapotaceæ.

"'It is extracted from the *Isonandra percha*, Hooker.

"'This genus originated from two plants in my collection; afterwards three more were discovered, all of India, the properties of which have not yet been investigated.

"'The Isonandra of the Indias differs from that of the Filipinas in that the flowers of the Filipinas are hexamerous while those of India, tetramerous; in other respects these two species are so analogous as to appear to be species of the same genus; yet there is a difference in their properties as there is in their flowers.'"—*Revista Catolica de Filipinas, Wednesday, February 1, 1893.*

Gum elastic.

"Gum elastic is extracted from trees belonging to the family of the Urticaceæ principally the Ficus elastica and is so well known that there are many growing in the gardens of Manila. It is also extracted from the Ficus radicans and from two other species of ficus which grow in the forests of the Philippines; also from various trees of the genus Artocarpus.

"The Gutta-percha of the commerce of Manila comes from the trees of the family sapotaceæ of the genus Sideroxilon, Dichopsis and principally Palaquium.

"The gutta-percha coming from Mindanao is sometimes adulterated, being mixed with the juice of the Alstonia and other trees which have a milky juice but which is not of the consistency of gutta-percha."—*R. Garcia.*

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Tree species of the Sapotaceæ and Urticaceæ families found in the Philippine Islands.

Lucuma mammosa Gærtn., Chico mamey.
Sideroxilon attenuatum, A. DC.
Sideroxilon ferrugineum, Hook.
Sideroxilon parvifolium, F. Vill.
Sideroxilon Duclitan, Blanco, Duclitan.
Sideroxilon nitidum, Bl.
Sideroxilon Balitbitan, Blanco.
Achras Sapota, Linn., Chico.
Palaquium latifolium, Blanco, Palacpalac.
Palaquium oleiferum, Blanco, Alacap.
Palaquium luzoniense, Vid., Bagalangit.
Palaquium lanceolatum, Blanco, Bagalangit.
Palaquium cuneatum, Vid.
Isonandra Gutta, Hook, Malaputat.
Chrysophyllum grandifolium, Steud.
Dichopsis polyantha, Wall.
Dichopsis cuneata, Bl.
Bassia butyracea, Roxb.
Azaola Betis, Blanco, Betis.
Mimusops Elengi, L., Cabiqui.
Mimusops parvifolia, Br., Bansalaguin.
Mimusops Manilkara, G. Don.
Artocarpus incisa, L. f., Antipolo.
Artocarpus Rima, Blanco, Rima.
Artocarpus elastica, Reinw., Tugup.
Artocarpus Camansi, Blanco, Camangsi.
Artocarpus odoratissima, Blanco, Lolol.
Artocarpus polyphema, Pers., Marang.
Artocarpus integrifolia, Willd., Nangca.
Artocarpus Cumingiana, Trec., Cubi.
Artocarpus ovata, Blanco, Anubing.
Artocarpus nitida, Trec., Bayuco.
Ficus indica, Linn., Baliti.
Ficus clusioides, Miq., Balete.
Ficus benjamina, Linn., Baliti.
Ficus microcarpa, Linn. f., Bigaa.
Ficus parvifolia, Miq., Baliti.
Ficus concinna, Miq., Nonoc.
Ficus hæmatocarpa, Bl., Taglicot.
Ficus pungens, Reinw., Agos-os.
Ficus hirta, Vahl, Biri.
Ficus heterophylla, L. f., As-is or Is-is.
Ficus polycarpa, Roxb.
Ficus radicans, var. angulosa, Miq., Taquines.
Ficus hederacea, Roxb., Haguimit.
Ficus subracemosa, Bl., Hauili.
Ficus racemifera, Roxb., Tabuyog.
Ficus glomerata, Willd., Aymit.
Ficus cuneata, Miq., Dungarug.
Ficus leucopleura, Bl., Lagnob.
Ficus radiata, Dcne, Lagnob.
Ficus pseudo-palma, Blanco, Sulamiog.
Ficus pilosa, Reinw., Taquines.
Ficus nuda, Miq.
Ficus callophylla, Bl.
Ficus conocarpa, Miq.

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REPORTS OF CHIEF BUREAU OF FORESTRY, P. I.

[Extract from report for 1902.]

Market price for manufactured lumber.

The following table shows the average prices of boards nine-sixteenths, seven-sixteenths, five-eighths, three-eights, one-half, and 1 inch in thickness per cubic foot:

Lauan	$1.00 to $1.12	Guijo	$2.25
Tanguile	1.40	Acle	2.50 to $3.00
Manicnic	1.30	Calantas	3.00
Molave	4.00 to 4.50	Batitinan	3.00
Dungon	3.00	Yacal	1.80 to 1.90
Panao	2.00	Betis	2.00
Apitong	1.40	Banuyo	1.50
Narra	4.00 to 5.00	Amuguis	.83
Tindalo	4.00	Balacat	1.12
Ipil	4.00		

Imported lumber.

Several departments of the United States Government in these islands find it necessary to import several million feet of manufactured lumber from the United States and Borneo, owing to the high prices and scarcity of native lumber.

The average prices paid for the above lumber is as follows, in gold, per thousand:

Oregon pine, laid down at Portland, Oreg	$9.00
Oregon pine, laid down at Manila, from	21.65 to $26.50
Redwood, laid down at Manila	31.50
Borneo lumber, laid down at Manila	65.00

Cord wood.

Cord wood in the provinces costs from $4 to $7 per 1,000 rajas. Freight to Manila from $12 to $15 per 1,000 rajas.

Transportation by hand from dock to yards in Manila costs about $4 per 1,000 rajas. Licenses to sell cord wood in Manila cost $60 per year.

Market price of cord wood in Manila.

Rajas, superior class, sticks 4 to 5 inches in diameter and 3 feet long, $40 to $50 per 1,000 rajas. (At the present time, August, 1902, the price is $56.50, but this is unusually high.)

Rajas, first-class, sticks 3 inches in diameter and 3 feet long, $20 to $30 per 1,000 rajas.

Rajas, intermediate class, containing sticks of both superior and first class, $28 to $35 per 1,000 rajas.

Split sticks, about 2 feet long and 1 inch in diameter, three to four sticks for 1 cent, according to grade.

Charcoal.

Charcoal sells for $1 to $1.20 per sack, containing 27 "gantas." Most of it, however, is sold to the natives by the ganta, the price ranging from 10 to 12 cents.

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The forests of the Philippine Islands.

The various charts show from 948 to 1,725 islands, with a total area of about 119,542 square miles. Of this great number of islands the two largest are Luzon (47,238 square miles) and Mindanao (36,237 square miles). The next largest is Samar (5,040 square miles). There are eight others of more than 1,000 square miles and but six additional islands of more than 100 square miles, some fifty or more smaller islands of minor importance, thus leaving about 1,600 islands not worth mentioning, many of them nothing more than great masses of rock and sand, with little plant life visible.

The area of the Philippine Islands as given by various Spanish engineers runs between a little less than 70,000,000 to a little more than 73,000,000 acres. The forest area was estimated by Fernando Castro in 1890 at about 48,112,920 acres. This estimate includes all woodland, public and private. The area of private woodlands held under a good title is far below 1,000,000 acres.

All owners of private woodlands must register their titles to such lands in the forestry bureau at Manila before cutting for the market any timber or firewood on such property. If these titles are not registered in the forestry bureau, the wood cut is charged for as if cut on public lands. At present the total area of private woodland registered in this bureau is about 250,000 acres.

As far as we can learn from the former forestry officials in these islands no scientific examination was ever made of the stand of timber. This work is now being carried on by field parties from the forestry bureau. Field parties have examined the forests in the provinces of Bataan and South Camarines, and are now in the forests of Mindoro and Baler. These parties inaugurate their work by a preliminary reconnoissance of the region. They then make a detailed investigation of the amount and varieties of standing timber, measuring and noting carefully every tree included in the sample acres selected. A botanical collection is made at this time. A log at least 6 feet in length is taken from the tree from which the leaf, fruit, and flower are taken.

There are between 600 and 700 native tree species, of which there is some information, but there is great confusion in both scientific and popular names of tree species which it will take much time to correct. Upward of 50 species are found on an acre and several hundred species in a comparatively limited region. From Bataan Province alone we have valuation surveys on about 600 average acres, and before the work is closed some 500 more will be added. From these surveys much interesting information will be gathered concerning the stand and varieties of timber, their peculiarities of growth, character of the soil, and rock formation. (See chapter on Bataan.) In addition there will be notes on methods and cost of logging, labor, means of transportation, character of roads and streams, as well as a topographical map, on which will be shown the location of the valuation surveys, thus enabling any one to see at a glance the amount and value of timber available and the possibilities of bringing it to market.

This investigation will extend all over the islands, as trained men, capable of managing such work, are secured from the United States.

A preliminary examination of the forests of the Philippines shows that they have been almost entirely destroyed in many places. This line of destruction seems to follow the line of civilization. In Cebu—the first island settled by the Spaniards—almost every stick of merchantable timber has been cut away, and no good reproduction has ever taken place. In Panay and Negros, as well as in many provinces of Luzon, very little merchantable timber of a high grade is to be found.

A trip on the railway from Manila to Dagupan will not reveal much good timber within several miles of the road. In many of the islands the good timber has been cut away for about 3 miles back from the coast. But as we leave the centers of civilization, we soon run into virgin forests, where the stand of timber over 20 inches in diameter averages in places close to 7,000 cubic feet per acre; some sample acres show more than 10,000 cubic feet. In the total of forty odd million acres of woodland, we find at the very least 20,000,000 acres of virgin forest. We find virgin forests in the provinces of Cagayan, Isabela, Nueva Viscaya, and in that part of Tayabas formerly known as Principe and Infanta; in fact, the entire east coast of Luzon, south to Atimonan, is a virgin forest. The above-mentioned forests in Luzon will aggregate an area of at least 3,000,000 acres.

The above is a conservative estimate, and any change made later will undoubtedly be to increase the estimate instead of reducing it.

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There is much merchantable timber left in the provinces of Tayabas, Camarines, parts of Bulacan, and Bataan.

The islands of Mindoro and Paragua, each containing an area of more than 2,000,000 acres, are covered with a dense stand of virgin timber.

Mindanao, with an area of 23,000,000 acres, contains more than 10,000,000 acres of virgin forest. Samar and Leyte—both large islands—are heavily timbered.

All of these latter islands are well supplied with water courses sufficiently large for driving logs. Many of these streams need a little clearing before driving could begin. One fine tract of timber near Manila has been protected up to the present time by a small obstruction in a stream that an American logging company would have removed in a very few days and at slight expense.

A glance at the topography of the islands will show the logger that the average length of haul to tide water is a short one. A combination of a short line of railway with the wire-cable system of logging would be ideal for a country with a topography such as these islands present. The methods of logging are very crude, as the carabao is relied upon as the principal means of transportation. The methods of felling trees are slow and antiquated. Wasteful methods of cutting are evident everywhere, and it is extremely doubtful if an average of 35 per cent of the merchantable timber cut is taken from the forest to the market.

Several hundred varieties of native woods are received in the Manila market during the year. Spanish engineers tested and described only some 70 varieties, so that we have many species in the market to-day that are not popular, owing to the lack of reliable information concerning their strength, durability, and suitability for construction purposes. Where strength and durability are especially desired there are no finer construction woods in the world to-day than molave, ipil, and yacal.

There are many other native woods which, when tested, will find a place with those just mentioned.

We have a number of woods which will attract the fine-furniture makers, of which may be mentioned narra, tindalo, camagon, ebano, calamansanay, tucancalao, and alintatao. These varieties are found all over the islands. We find also 11 different oaks, cedar in abundance, teak, and many other species awaiting investigation to bring out their value.

At this time no more than a mere mention will be made of the fact that there are large areas in the southern islands of this group where gutta-percha and a good quality of rubber are found. The islands are rich in other gums, in a great variety of valuable dyewoods, and other forest products that time and enterprise will develop.

At present very little cutting is going on in the virgin forests of the islands. Nearly all of the cutting is found in those provinces and islands which have been cut over for many years. Two or three licensees have established themselves at good points in virgin tracts, and there is no reason why satisfactory returns should not be realized from cuttings in such places.

It would be difficult at this time to even approximate the present value of the timber on public lands in the Philippines. Statistics of this office show that several hundred varieties of native woods are brought to market in the islands and are disposed of at a fair price. The government charges for the past year on this great variety of woods averaged a little over 6 cents Mexican per cubic foot Spanish. This charge has continued to remain between 5 and 10 per cent of the market price of timber in Manila.

It will be safe to assume an average stand of about 3,500 cubic feet English or 4,600 cubic feet Spanish, although the valuation surveys give double this estimate of merchantable timber (over 20 inches in diameter) on each acre of the 20,000,000 acres of virgin forests in these islands.

At the above valuation of 6 cents per cubic foot, it is evident that the value to the Philippine government of the above timber is more than $100 gold per acre. By removing this timber under the supervision of forestry officials, each forest tract will gradually improve in value, and while realizing the large sum mentioned, the value per acre of public timber land will eventually approach its true and permanent value, which will be much nearer $200 gold per acre than $100; i. e., after the great mass of mature and overmature timber is removed, the revenue from the sale of the annual increase of growth of public timber will, under careful supervision, bring to the State a fair interest on the valuation per acre as given above.

The remaining public woodland, about 28,000,000 acres, will average in value not less than one-half the value as given for the virgin forest. A small part of

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this remaining woodland will be taken up as mineral land and for agricultural purposes. After three centuries of civilization in the islands, we find but 6,000,000 acres improved out of a total area of 63,000,000 acres. It will be safe to assume that the Forestry Bureau will have at least 20,000,000 of the 28,000,000 acres to protect and improve for many years to come. This area, added to the 20,000,000 acres of virgin forest, will give to the state an area of 40,000,000 acres of valuable woodland.

By diverting the efforts of the timber cutters to the virgin forests, and by a rigid protection of the remaining woodland, the value of the total area will, in about thirty years, reach a value undreamed of to-day by those not familiar with what rational forestry is capable of accomplishing.

The United States market is not considered in this proposition. The Philippine market will be strong for many years. The Chinese market is always strong, and always will be, as all of lowland China is without timber. The Philippine construction timber is considered by many engineers in China the best timber to be had in the Orient. Strong as has been the Chinese market for timber in the past, the future promises even better, as there are indications that foreign enterprise and capital are securing concessions which will awaken that vast Empire.

[Extract from Report for 1905.]

The Sawmills of Manila.

There are about 40 sawmills in Manila. Of this number, 3 mills—those of John Gibson, the Philippine Lumber and Development Company, and the B. W. Cadwallader Company—are American steam mills of the best type, equipped with band saws and other modern machinery. The Manila sawmill and the mill of Tuason & San Pedro are steam mills, equipped with vertical gang saws and circular saws. The remaining mills are small concerns, which deal in logs and lumber, saw by hand, and occasionally send logs to the steam mills to be sawn.

When the steam mills were introduced it was very difficult to secure reliable native labor and competent mill men. Difficulty was also experienced in sawing the hard woods, such as betis and dungon. These difficutlies have now been overcome and the mills are operating in a very satisfactory manner.

The sawing capacity of the 5 steam mills is about 2,500,000 board feet per month, while the amount of timber received per month, in logs, in Manila averages only a little over 1,000,000 feet B. M. Mills experience much difficulty in securing logs with which to fill their orders, so that their sawing is regulated largely by the quantity of logs received.

The American mill men find it very difficult to do business with the Chinamen and natives who bring timber into Manila. The latter receive a shipment of logs, and often will not sell for any price until they have had two or three weeks to investigate the market, and then, if they find the market short, are likely to advance the price 50 or 60 per cent. To make themselves independent of the slow business methods in vogue, the three American mill managers are considering the feasibility of establishing a depository for logs of the most common species. They will then be able to ship timber into Manila in excess of running requirements, and buy in the local market only when timber is plentiful. It is obvious that such a depository would be of great benefit to the American mills, as expensive shut downs would cease. It would also tend to regulate the shipments of timber and would reduce the present great fluctuations in price.

At the Manila sawmill and the mill of Tuason & San Pedro all sawing is done by circular saws and vertical gang saws. The lumber produced is of first-class quality, and these mills are competing successfully with the American mills, even though they lack many of the labor-saving devices possessed by the latter.

More than half the timber brought into Manila is in the form of square logs, and it is those logs that give the mill men the most trouble, for most of them are quite dry and are much more difficult to saw for this reason.

The amount of sawing done by the hand mills has gradually decreased since the introduction of the steam mills, until at present very little lumber is being thus sawn for the market, the steam mills being able to saw at one-third to one-half the cost at which sawing can be done by hand.

The number of small hand mills and the volume of business done by them has not been affected by the operation of the large American mills, but the nature of their business has changed. The sawing is now a minor consideration,

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the purchase and sale of logs and lumber and contracting now comprising the more profitable part of their business.

The cost of sawing the native hard woods varies according to the hardness, toughness, and character of fiber of the wood. The price for sawing varies from $6.50 to $20 gold per thousand feet B. M.

White Ants (Anay).

Small blocks of lauan and apitong, prepared by the bureau of government laboratories, were placed near a nest of white ants at the timber-testing laboratory on April 25, 1904; location in sandy soil, near the Pasig River. On June 9, 1904, the blocks were examined and all were found to be in good condition. They were replaced and examined again on March 28, 1905, when their condition was found to be as follows:

Set No. 1.—Saturated with ½ per cent of a solution of naphtholene in benzole: Lauan badly decayed and slightly attacked by white ants. Apitong, slightly decayed, but not attacked by the white ants.

Set No. 2.—Saturated with 1 per cent of zinc sulphate in water: Lauan, badly decayed; not attacked by the white ants. Apitong, slightly decayed; not attacked by the white ants.

Set No. 3.—Treated with $\frac{1}{100}$ solution of bichloride of mercury: Lauan, in excellent condition; not attacked by the white ants. Apitong, in excellent condition; not attacked by the white ants.

Set No. 4.—Untreated: Lauan, badly decayed and badly attacked by the white ants. Apitong, slightly decayed; not attacked by the white ants.

The United States Forest Service has forwarded to this bureau 108 pieces of Pacific coast timbers for the purpose of testing their resisting qualities in the Philippine Islands to decay and the attack of the white ant.

These specimens comprise ten of the most important United States timbers, viz, red fir, western hemlock, spruce, white spruce, lodgepole pine, California redwood, sugar pine, white pine, cedar, and mountain pine. These specimens were secured from various sawmills in the Western States from California to Montana.

They were divided into three sets. One set was untreated and the other two sets were treated with creosote and a solution of mercuric chloride, respectively.

The specimens were planted, as per instructions, near Station No. 2, on the Lamao Forest Reserve on July 5, 1905. A report on the results of this test will be made some time during the coming year.

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REPORT ON THE ECONOMICAL USE OF NATIVE AND IMPORTED WOODS FOR CONSTRUCTION PURPOSES IN THE PHILIPPINE ISLANDS.

By W. E. Parsons, Consulting Architect.

[Extract from Official Gazette, Aug. 15, 1906, p. 498.]

The following is a report of the Consulting Architect, dated July 17, 1906, on the economical use of native and imported woods for construction purposes in this climate, furnished at the request of the Commission, and is published for the information of Insular, provincial, and municipal officials:

"For the consideration of this subject, it is convenient to consider the various kinds of woods used for building purposes in the Philippines, as divided into three general classes: (1) Native hard woods, (2) native soft woods, and (3) imported soft woods.

"The questions at issue are: First, the use of hard wood as opposed to soft wood economically considered; and, secondly, a comparison of soft woods, native and foreign.

"Considering the first question, in the opinion of the undersigned, timber buildings, the structural members of which are of hard wood, are the more economical in the long run. By structural members are meant those parts which serve to support or brace the building or any parts of it; such are posts, columns, girders, beams, joists, sills, braces, plates, trusses, and purlins. By hard wood is meant those woods of the first and second groups commonly used for building purposes, such as molave, ipil, dungon, tindalo, narra, acle, guijo.

"Experience has shown that of these, certain woods are preferable for uprights, certain ones for beams. Molave is commonly used for posts at the foundation, where the construction is liable to the attack of ants and subject to decay.

"Nonstructural members are those parts not essential to the strength of a building; if decayed or ant-eaten, they can be removed and replaced, without impairing the stability of the building; such parts are nonbearing partitions, doors, sheathing, screen, louvres, etc., and these may be of soft wood. It is essential also that parts exposed to the elements and floors be of wood of good quality, some of the less expensive hard woods being useful for this purpose. Such woods are guijo, apitong, and supa.

"Attention is respectfully invited to another point almost as important as the selection of the wood—the necessity of open or exposed construction. Since the anay are very sensitive to the light, and can live only in the dark, it is essential that constructive members be open and exposed to the light. All furring, sheathing, casings, double partitions, and similar construction, so common in America, should be avoided in this country.

"Secondly, a comparison of native and imported soft woods involves chiefly lauan and balacbacan of the former class, and Oregon pine and California redwood of the latter. The use, however, of redwood is insignificant compared with pine and may not be considered here. Lauan is probably the most abundant of timber trees in the Islands. Oregon pine has up to the present time had the advantage (1) of being obtainable in large quantities on short notice; (2) of being better seasoned and in general more even in quality than lauan; (3) its tensile and compressive strength is slightly greater.

"Lauan and balacbacan and native woods of this group have the advantage of being usually free from knots and consequently easier to work. These woods are also superior in interior work where natural finish is desired. One of the chief difficulties with the use of lauan and similar woods has been the lack of proper care in selection and seasoning. It varies greatly in quality; with the result that many persons who have been unfortunate in using inferior lots have become much prejudiced against it. The better qualities are found in the

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large trees where the fibers are much more compact than in the younger trees. Little or no attention has been given to seasoning, for the mills have been in the habit of sawing to order, in order to avoid carrying in stock large quantities of sawn lumber; the mills have not facilities for kiln-drying lumber in large quantities. There is a small kiln in use at the Gibson mill in which wood for furniture is seasoned. The lauan seasoned there is giving entire satisfaction.

"The Insular Lumber Company, with cuttings in Negros, is confident of the success of lauan and is preparing for large deliveries of well-seasoned, kiln-dried material at a lower cost than Oregon pine.

"It is claimed that lauan and other similar woods can be successfully treated with creosote, adding greatly to its durability: whereas with Oregon pine, such treatment is not practicable. Experiments show that creosoting costs about $0.10 (United States currency) per cubic foot.

"While it is certain that no wood is really anay-proof, there being cases where even molave has been destroyed, yet Oregon pine is considered the material most liable to be attacked. The fact that a good many pine buildings have stood the test for four or five years has encouraged many builders to use it extensively and run the chances of white ants. It is stated that new wood is less likely to be attacked than old, this fact being accounted for by the stronger odor of new wood.

"There is a strong and increasing demand, in private work, for Oregon pine, both by Americans and Filipinos. One of the prominent lumber dealers, John Gibson, who heretofore has carried only native lumber, has found it necessary to carry a large stock of pine and redwood.

"Attention is respectfully invited to a comparison between former and present building methods and materials employed in these Islands. Formerly the timbers, stone, mortar, bricks, and tile roofing, and nearly all the materials for building construction, were of native production. At present there is a strong tendency toward the construction of entire buildings of imported materials, in which Oregon pine and galvanized-iron roofing form a conspicuous part.

"From the economical as well as from the architectural point of view, it is respectfully recommended that soft woods, both native and imported, be excluded from use as structural members in all permanent public buildings.

"W. E. PARSONS, *Consulting Architect.*"

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(Circular No. 1.)

OPPORTUNITIES FOR LUMBERING IN THE PHILIPPINE ISLANDS.

BUREAU OF FORESTRY,
Manila, P. I., December 1, 1906.

OWNERSHIP OF FORESTS.

The Philippine public forests cover an area of more than 40,000,000 acres. Less than half a million acres of forest are held by private owners. Under an act of Congress in 1902 the Philippine forests can not be sold, leased, or homesteaded unless the same are more valuable for agriculture than for forest purposes.

LICENSES TO EXPLOIT THE PUBLIC FORESTS.

Exclusive licenses may be granted for terms up to twenty years. These give the holders sole right to exploit certain forest products. The extent of the territory thus granted depends upon the size of the plant to be installed. No charge is made for such a license, and only stumpage charges are imposed. These charges range from ₱0.50 to ₱2.50 per cubic meter, or approximately from $1 to $5 (United States currency) per thousand feet B. M. Such an arrangement is preferable to buying the land, since no land taxes are incurred. There are a number of desirable tracts of public forest of large extent now unexploited.

TARIFF RATES.

There are no export duties on timber or on the manufactured product. Logs imported into the United States are admitted free. The import duty at Manila on sawmill and logging machinery is 5 per cent ad valorem.

FREIGHT RATES TO MARKET.

Freight rates from Manila to the Pacific coast amount to $7 (United States currency) per ton (logs), about 40 cubic feet, or $12 to $14 per thousand feet B. M. Freight rates from Manila to the Atlantic coast of the United States are $14 to $15 (United States currency) per thousand feet B. M., or $8 per ton of 40 cubic feet; light-weight material, $5 per 40 cubic feet.

Distances to market.

Distance from—	Manila, P. I.	Cebu, P. I.	Iloilo, P. I.	Hongkong, China.	Shanghai, China.	Sydney, Australia.
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Seattle, U. S. A.	6,400			6,300	6,200	6,800
Cadiz, Negros Occidental	400	140	70	800	1,300	3,370
Bongabon, Mindoro	200			700	1,200	3,570

CONSUMPTION OF LUMBER.

	Board feet.
Amount of lumber used in the Philippine Islands per year, approximately	100,000,000
Amount of American pine used in China during the past year	85,000,000
Amount of American pine used in Australia during the past year	63,000,000

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PHILIPPINE TIMBERS.

In Bulletin No. 4 of the bureau of forestry thirty common Philippine timbers are discussed. In this bulletin extensive tests show the qualities of the timbers. There is also a brief description of the different woods. Common Philippine timber as good as American pine can be laid down at tide water for about the same price as pine on the Pacific coast. Difference in freight rates, low stumpage, and cheap labor should combine to make a low rate on the manufactured Philippine product in the Chinese and Australian markets and should gradually replace the American product.

STAND OF TIMBER.

In Bulletins Nos. 5 and 6 can be obtained the actual stand of timber on tracts in Negros and Mindoro. These show 10,000 to 32,000 board feet per acre. The lower slopes of Mount Silay in northern Negros are practically covered with merchantable timber. One block of this forest, 69 square miles in area, shows a stand of 32,050 board feet per acre of merchantable timber over 20 inches in diameter. A large area of similar forest on Mount Silay adjoins this tract and awaits the lumberman. In the southwestern part of this province (Negros Occidental) is a large area of valuable forest which will be close to the southern terminus of the new railway.

There are a number of regions in these islands where dense forests of valuable timber are found which have never been exploited for the market. The Agusan Valley, in Mindanao, 4,000 square miles in area, is almost entirely covered with virgin forest and drained by large streams. The dense forests on the coast of Mindanao are also unexploited.

LABOR PROBLEM.

Labor is not difficult to secure. The wages range from ₱0.50 to ₱1.50 ($0.25 to $0.75, United States currency) per day. Filipinos are apt at handling machines of all kinds and work satisfactorily when treated with consideration. Skilled American loggers and lumbermen, assisted by Filipino crews, should get out logs and manufactured material at prices not far from those quoted for pine on the Pacific coast, especially in regions where we find 30,000 board feet of merchantable timber on each acre close to tide water, and where no special logging difficulties are encountered.

LOGGING.

Logging is carried on during the entire year in many provinces. In some places logging is suspended during the seasons of heaviest rains, a period of from two to four months. The logging methods are very crude.

Many of the native woods will float, and, if handled by the expert raftsmen of the Pacific coast, could be rafted 200 to 600 miles through the quiet inland seas to Manila, and possibly to China, which is about 660 miles from Manila. Not one of the lumber companies of the Pacific coast is actively interested in exploiting the Philippine forests.

LUMBER DEALERS.

The leading lumber dealers in the Philippine Islands are: John Gibson, Insular Lumber Company, Cadwallader & Co., Philippine Lumber and Development Company, Tuason & Sampedro, California-Manila Lumber and Commercial Company.

The offices of these companies are in Manila. For discussion of sawmills see Bulletin No. 4.

CAPITAL NECESSARY TO ESTABLISH LUMBERING OPERATIONS.

The question is often asked, "What capital is necessary to carry on a successful lumbering enterprise in the Philippines?" Such an enterprise should not be attempted unless the company intends to handle the product from start to finish, including transportation, lumber yards at the principal markets, supply stores for use of employees in the forest, etc. This would probably involve the employment of not less than $200,000 (United States currency). A company contemplating logging operations should send a practical logger to look over the ground with an officer of the bureau of forestry.

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SUMMARY OF LUMBERING POSSIBILITIES ON ONE TRACT OF PUBLIC FOREST IN NEGROS OCCIDENTAL.

In Bulletin No. 5 of the bureau of forestry a description is given of the forests and lumbering operations near Cadiz, Negros Occidental. The summary of this bulletin is as follows:

Area of tract, 69 square miles; area in forest, 37,668 acres.

Stumpage charges on this tract are collected on manufactured lumber and average less than $1.20 (United States currency) per thousand feet B. M.

Six tree species constitute about 90 per cent of the total stand of merchantable timber on the entire tract.

Amount and value of merchantable timber on tract over 20 inches in diameter.

Species.	Stumpage charge, M feet B.M. (approximate).	Feet B.M. per acre.	Total yield, M feet B.M.	Manila price, M feet B.M.	Value per acre.	Total value.
Apitong	₱4	5,140	193,572	₱90-₱115	₱460	₱17,421,480
Almon	2	7,150	269,269	70- 90	500	18,848,830
Balacbacan	4	4,640	174,742	70- 90	325	12,231,940
Mangachapuy (Red Lauan)	2	13,240	498,618	70- 90	925	34,908,260
Lauan-bagtican and Lauan-dunlog	2	1,880	70,801	70- 90	130	4,956,070
Total		32,050	1,207,002		2,340	88,361,580

₱2 equals $1, United States currency.

SUMMARY OF LUMBERING POSSIBILITIES ON ONE TRACT OF PUBLIC FOREST IN MINDORO.

In Bulletin No. 6 of the bureau of forestry a description is given of the forest and lumbering possibilities of one tract on the east coast of Mindoro. The summary of this bulletin is as follows:

Area of tract, approximately 85 square miles; area of tract surveyed, 55 square miles; area of part of commercial forest (measured), 11,339 acres (not including mangrove swamps).

Stumpage charges on this tract average less than $2 (United States currency) per thousand board feet.

Seven merchantable tree species constitute about 50 per cent of the total stand on this tract.

Amount and value of merchantable timber on 11,339 acres of forest (trees over 16 inches in diameter).

Species.	Stumpage charge per M feet B.M. (approximate).	Yield M feet B.M.	Manila price.	Total value at lower prices.
Narra	₱10	4,534	₱225-₱275	₱1,020,150
Hagachac	2	17,285	90- 115	1,555,650
Lauan	2	46,464	70- 90	3,252,480
Amuguis	4	11,378	110- 150	1,251,580
Guijo	6	13,973	98- 140	1,368,354
Apitong	4	4,174	90- 115	375,660
Sacat	4	8,429	100- 150	342,900
Total		101,237		9,166,724

A total yield of 101,237,000 feet B. M. on 11,339 acres, or about 9,000 feet B. M. per acre. Lumber worth ₱810 per acre.

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AID FROM THE BUREAU OF FORESTRY.

A study of Bulletins Nos. 5 and 6 of this bureau will indicate to the lumbermen what the bureau will do for them. Forest officers will use every effort to make such propositions succeed financially. Upon request samples of wood may be obtained at the office of the bureau of forestry.

GEORGE P. AHERN, *Director of Forestry.*

[Bulletin No. 4—2d Edition.]

By ROLLAND GARDNER, *Manager of the timber-testing laboratory.*

BUREAU OF FORESTRY,
Manila, July 2, 1907.

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II. PHILIPPINE SAWMILLS, LUMBER MARKET, AND PRICES.

Manila is the principal lumber market of the Philippine Islands. Here are located five of the most important mills. Timber is being shipped to them from all parts of the Islands. Three of these mills are equipped with heavy band saws and other modern machinery. The other mills are equipped with vertical gang and circular saws. The combined maximum daily output of the five mills is about 90,000 board feet per day. One mill has a capacity of 30,000 board feet, two of 20,000 board feet, and two of 10,000 board feet per day.

During the early operations of the mills in Manila, they had to contend with numerous difficulties; Filipino labor was unreliable; many of the hard woods were difficult to saw and it was impossible to secure a sufficient supply of logs from the provinces with regularity. Conditions have improved, however, during the past two years, and the mills are now operating in a very satisfactory manner. They now saw all commercial woods without difficulty and are depending more and more upon their own cuttings to supply logs to meet their requirements. With proper training, Filipinos are found to be apt in handling machinery. Two of the mills have recently been running at night to fill orders.

Some confusion exists in the market regarding the identity of a few of the leading commercial woods. This is especially true of Lauan. At least six different woods are now being marketed under that name. From the commercial standpoint this is not important, however, as all of these woods resemble the true Lauan (*Shorea contorta*) closely and are of about the same quality. There are several different kinds of wood being sold for Apitong, and occasionally Apitong is sold for Guijo. Lauan, Apitong, and Guijo are used to a larger extent than any other fifteen native woods.

Logs are bought and sold by the Spanish cubic foot. One Spanish cubic foot equals 0.765 of an English cubic foot. Lumber is bought and sold by the thousand English board feet.

In sawing the average-sized logs that are brought into the market, between 5 and 6½ board feet are obtained from 1 Spanish cubic foot, but in the large-sized logs sometimes as high as 8 board feet are cut from 1 Spanish cubic foot.

Until quite recently it has been practically impossible to obtain well-seasoned lumber in the market. The mills have been accustomed to sawing to order, consequently lumber was seldom in the yards a sufficient length of time to become seasoned. There were no facilities for kiln drying lumber in large quantities. Two small kilns were erected several years ago, but they were of small capacity and have not been used extensively. One of the leading mills has recently installed a kiln of about 50,000 board feet capacity which is operating very satisfactorily. This kiln is capable of drying 100,000 board feet or more of native lumber per month, the amount depending upon the texture and thickness of the lumber. This concern is now using kiln-dried native lumber in its cabinet factory and is preparing to kiln dry Oregon Pine and California Redwood for use in its planing mill.

A considerable amount of imported lumber is still used in the Islands. Most of this is Oregon Pine and California Redwood. During the period from July 1,

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1904, to June 30, 1905, 29,679,644 board feet of lumber and timber, and 9,261 pieces of timber (dimensions not known) were imported. During the same period, 139,148.77 cubic meters of native timber were cut. If this were all sawn into lumber, it would make about 40,000,000 board feet.

The price of logs fluctuates from day to day. The following table gives the Manila market prices on August 1, 1907:

Manila market prices.

[Philippine currency.]

Kind of wood.	Logs per Spanish cubic foot.	Sawing per 1,000 English board feet.	Lumber per 1,000 English board feet.
Lauan	₱0.30-0.35	₱13.00-15.00	₱70.00- 90.00
Apitong	.35- .37	16.00-18.00	85.00-100.00
Guijo	.50- .65	16.00-18.00	98.00-140.00
Molavo	.80- .90	21.00-23.00	215.00-300.00
Yacal	.65-1.00	21.00-23.00	160.00-200.00
Yellow Narra	.70- .80	16.00-23.00	225.00-275.00
Red Narra	.75-1.00	16.00-23.00	250.00-300.00
Tanguile, or Balacbacan	.33- .45	13.00-18.00	95.00-120.00
Sacat	.40- .75	15.00-18.00	100.00-150.00
Ipil	.76- .85	21.00-23.00	180.00-225.00
Dungon	.80- .90	38.00-40.00	185.00-200.00
Supa	.65- .70	21.00-23.00	140.00-220.50
Balacat	.40	18.00	100.00
Macaasin	.40- .75	15.00-18.00	110.00-150.00
Calantas	.65-1.20	13.00-15.00	180.00-200.00
Tindalo	.78-1.00	21.00-23.00	250.00-300.00
Amuguis	.40- .75	18.00-21.00	110.00-150.00
Acle	.85-1.20	16.00-23.00	280.00-300.00
Betis	.70-1.00	38.00-40.00	250.00-300.00
Bansalaguin	.45- .85	23.00	150.00-260.00
Palo Maria	.75- .80	18.00	140.00-160.00
Batitinan	.65- .75	21.00-23.00	150.00-280.00
Aranga	.50- .75	21.00-23.00	150.00-160.00
Banuyo	.55- .75	16.00-18.00	140.00-220.00
Malugay	.60- .65	16.00-23.00	95.00-130.00
Mayapis	.35	15.00	90.00

The Government stumpage charges in the provinces where large stands of timber are found range from $1 to $5, gold, per 1,000 board feet.

Besides those in Manila, there are an increasing number of sawmills scattered through the provinces. Most of these are small, with capacities ranging from 2,500 to 10,000 board feet per day.

The operations of one company in Negros Occidental are more extensive than those of any other company in the Islands. It is operating two sawmills on a tract of 69 square miles, 60 square miles of which are covered with an unusually heavy stand of timber, averaging about 32,000 board feet per acre of merchantable lumber. The smaller mill which has been in operation since 1902 has a capacity of 20,000 board feet per day but the daily cut is about 12,000 feet. The other mill which has recently been completed is a modern band mill of the best type with a capacity of 100,000 board feet per day and should saw at least 60,000 board feet per day when a mill crew has been trained. The trees known by the Visayan names of Balacbacan, Mangachapuy, and Almon are being cut principally; the first two are sold in Cebu, Iloilo, and Manila as Balacbacan and Red Lauan. Almon has the market name of White Lauan. This company is able to sell Lauan cheaper than other lumbermen, getting about ₱60 per 1,000 board feet for it in Manila. The company logs in a modern manner with donkey engines for skidding and a narrow-gauge railroad for hauling the logs to the mills. The company not only sells lumber in the principal markets of the Islands—Cebu, Iloilo, and Manila—but also has begun exporting the best grades to the United States.

Another company has a mill located on the Island of Basilan, which is cutting about 6,000 board feet of lumber per day. This lumber is marketed in Zamboanga, Iloilo, and Cebu. The Zamboanga prices quoted by this company are as follows:

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	Per 1,000 board feet.
Lumbayao	₱72.00
Guijo	80.00
Calantas	80.00
Yacal	140.00
Camagon	300.00
Tindalo	180.00
Ipil	180.00
Lauan	50.00
Narra	200.00

Planing, ₱7 extra per 1,000 board feet.

Another company, a branch of a Manila milling company, has recently installed in Mindoro a circular-saw mill with a capacity of 5,000 to 10,000 board feet per day. The lumber is shipped to Manila.

Near Baguio, Benguet, the summer capital of the Philippine Islands, there are three small mills sawing Benguet pine, which sells in Baguio and vicinity for ₱75 to ₱95 per 1,000 board feet. The capacity of these mills ranges from 2,500 to 6,500 board feet per day.

A small mill has recently been installed at Gattaran, Cagayan, which supplies Aparri and the towns in the Cagayan Valley with lumber. This mill charges ₱0.80 per English cubic foot for first group timber in the log, and ₱20 per 1,000 board feet for sawing.

About 2,500 board feet per day is the capacity of a mill which is cutting Agoho (*Casuarina equisetifolia* Forts.) almost exclusively at San Antonio, in the province of Tarlac. This is put on the market at Manila for ₱100 per 1,000 board feet.

A new company has recently received a timber concession in the Province of Tayabas and is now erecting a sawmill having a capacity of 15,000 board feet per day.

To supply the rapidly growing demand for timber for the new railroad in the Islands, preparations are now being made to install small mills at several places in the provinces.

The sawmills at present operating in the Philippine Islands, or nearly completed, are as follows:

Location.	Maximum daily output (board feet).	Principal markets.
Manila, P. I.	30,000	Manila.
Do	20,000	Do.
Do	20,000	Do.
Do	10,000	Do.
Do	10,000	Do.
Cadiz and Sagay, Negros Occidental	15,000	Manila, Cebu, Iloilo, and New York.
Do	60,000	Do.
Gattaran, Cagayan	(a)	Local.
Felisen, Lepanto-Bontoc	1,500	Do.
Baguio, Benguet	2,500	Do.
Do	3,500	Do.
Do	4,000	Do.
Bayombong, Nueva Vizcaya	(a)	Do.
San Antonio, Tarlac	2,500	Manila.
Murcia, Tarlac	(a)	Local.
Bollano, Pangasinan	(a)	Do.
Pinamalayan, Mindoro	5,000	Manila.
Mamburao, Mindoro	5,000	Local.
Mangarin, Mindoro	10,000	Manila.
Guinayangan, Tayabas	15,000	Do.
Ragay Gulf, Ambos Camarines	(a)	Do.
Tacloban, Leyte	3,000	Local.
Palompan, Leyte	4,000	Cebu and local.
Dumaguete, Negros Oriental	3,500	Local.
Iloilo, Iloilo	4,000	Iloilo.
Isabela, Basilan Island	6,000	Zamboanga.
Zamboanga, Moro	(a)	Local.
Cotabato, Moro	(a)	United States Army.
Parang, Moro	6,000	Do.
Marahui, Moro	(a)	Do.
Sibuguey Bay, Moro	(a)	Local and Philippine railway.

(a) Small mill.

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PHILIPPINE WOODS.

By Fred W. Foxworthy.

[Extract from The Philippine Journal of Science, C. Botany, October, 1907, vol. 2, No. 5.]

I. Introduction.

Much misinformation is current as to the names and characteristics of our native woods. A wood is often variously designated in the same or in different provinces and again, several different kinds are frequently found under an identical name, for example molave (*Vitex* spp.) has more than forty different names in the Archipelago, and this multiplicity of names for the same wood naturally results in confusion which is very much increased when, as often happens, the same name applies to different woods in different localities. This makes it very easy for the unscrupulous dealer to substitute a poor quality for a better. There is evident need of some quick and sure way of identifying the woods needed for furniture, construction, and other purposes, and therefore it has seemed desirable to prepare a brief guide and description of those which are found in commercial quantities in the Manila market. This has been a task of some difficulty, because of their large number and the unsteady and uncertain supply of any one species at any given time.

There are about sixty-five commercial woods furnished by about one hundred species which are nearly always to be found in Manila, and in addition, there are several times as many which may occasionally be brought here in small quantities, so that the resulting complication is considerable. It follows that the chances for error are very great; so that this paper at best can be only preliminary to the more complete work indicated by the title.

PREVIOUS WORK.

But little has been done in the way of careful study of the native woods; the literature is as follows:

Vidal y Soler (D. Domingo).—Manual del Maderero en Filipinas (1877), and other works by the same author.

Scattered notes by other Spanish authors.

Foreman (John).—The Philippine Islands. London (1899), 2d edition, 367–373; (1906), 3d edition, 312-317.

This author gives notes on some of the best-known commercial woods.

Ahern, George P.—Important Philippine Woods. Manila (1901).

This is a compilation of notes from previous writers. This book brought together what had been written of the Philippine woods before 1901.

Gardner, R.—Mechanical Tests, Properties, and Uses of Thirty Philippine Woods. Manila, *For. Bur. Bull.* (1906), 4, *2d edition* (Aug. 1907).

Whitford, H. N.—A preliminary Check-list of the Philippine Commercial Timbers. Manila, *For. Bur. Bull.* (1907), 7. (In press.)

The last two publications are most useful at the present time and they have been quoted extensively in this paper.

SCOPE AND METHODS OF THE PRESENT WORK.

In this paper the attempt has been made to give: 1. A general and technical discussion of wood. 2. A key to the common commercial woods. 3. Short notes on the structure, appearance, common names, range, and usefulness of individual species. 4. A very complete index.

Botanical material has furnished the starting point in correlating the name and wood which should go together; the botanical determination being made

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from herbarium material taken from the same tree as is the wood specimen; when the scientific name has been fixed and the structure studied, the wood is compared with commercial material until the latter can be determined definitely under its different names. Sections, whenever necessary, and as many as were necessary, have been made to determine doubtful points of structure.

The usefulness of this paper should consist in the ready classification of the commoner native woods; in the better understanding of their uses; in the finding of new applications for them and in discovering the relationships existing between the woods of the Philippine Islands and those of the rest of the world.

In addition to the ones already mentioned, the following sources of information have been used:

Roth and Fernow. Timber. Bul. Bur. of Forestry, U. S. Dept. of Agriculture (1895), *10.*

Gamble, J. S. A Manual of Indian Timbers. London (1902).

Janssonius, H. H. Mikrographie des Holzes. Leiden (1906).

Each of the American foresters of the Philippine Forest Service has aided the writer with material and observations. Special acknowledgments, however, are due Dr. H. N. Whitford and H. M. Curran, of the Bureau of Forestry, for their constantly helpful observations and the large amount of material furnished by them for the study of different woods. The field notes of Mr. J. R. Hillsman, of the Bureau of Internal Revenue, have also been of service.

II. General Discussion.

1. STRUCTURE.

(a) *Gross Morphology of Wood.*

CLASSES OF WOOD.—All woody plants may be grouped according to their stem structure and botanical relationships as *Pteridophytes, Monocotyledons* (*Endogens*), and *Exogens.*

Pteridophytes.—The hard tissue is scattered in large, irregular bundles through the stem; the latter is uneven, being made up of soft and very hard material. *Tree ferns* are included in this class; they do not come into the market, but the trunks of certain species are used locally in Benguet and elsewhere in northern Luzon as posts for houses.

Monocotyledons or Endogens.—The wood is composed of scattered, small bundles of hard, woody tissue, the interspaces being filled with soft tissue. This group includes the *bamboos, palms, pandans,* etc.

Bamboos.—No work on the woods of the Philippine Islands would be complete without some mention being made of the bamboos which furnish so large a part of the structural materials of the Archipelago. Several different species are used, but they all agree in having the peculiar monocotyledonous structure already described, modified by the stem being hollow and jointed. They also contain a considerable proportion of silica.

The *palms* do not have jointed stems and are not hollow, but the central part of the stem is usually very soft and brittle. From the outer part, which is very hard and which will take a high polish, canes, bows, and other articles are made. Palma brava (*Livistona* spp.) and the cocoanut palm (*Cocos nucifera* L.) are the ones most used. Some palm stems are also suitable for the manufacture of small ornamental pillars, where the top and bottom are not exposed to the air, and where the defective nature of the inner part of the stem is not displayed. Palms are also to some extent used for flooring and for corner posts of houses.

The *bejucos* and *rattans* (*Calamus, Daemonorops*) also being in this group, but as they occur in such small dimensions they are not considered in this paper.

The *pandans* or *screw pines* (*Pandanus* spp.) are widely distributed throughout the Archipelago. They are from a number of different species of the genus *Pandanus.*

The outer part of the stem of the *Pandanus* is usually very hard. I do not know of its commercial use here, but in some Pacific islands it furnishes an ornamental wood similar in texture, but inferior in finish, to that of the cocoanut (*Cocos nucifera* L.) and palma brava (*Livistona* spp.).

Exogens.—The remainder of our woody plants may be grouped together as *Exogens;* that is, the stem consists of a woody cylinder which grows in diameter by the addition of concentric layers about the wood already formed; there are

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two great groups; the *Gymnosperms*, or *Conifers*, and the *Angiosperms*, or broad-leaved plants. These may be distinguished as follows:

Conifers.—Wood, except in the first layer about the pith, containing no vessels; that is, nonporous; exceedingly regular in structure. There are a number of *Conifers* native to the Islands, but they are scattered in small patches or in almost inaccessible places on the mountains. The only native *Conifer* that is cut at all for timber is the Benguet pine (*Pinus insularis* Endl.) and it scarcely comes into the Manila market at all. However, a large amount of coniferous wood is imported; nearly all of this is California redwood or Oregon pine, although an occasional piece of coniferous timber from Australia, Japan, or China is encountered.

Angiosperms.—The remaining group, the broad-leaved trees, furnishes practically all of the Philippine wood found in the lumber yards, and further discussion will apply to woods of this group unless otherwise indicated.

PARTS OF THE STEM.

Pith, wood, and bark.—In examining the end of a log, three distinct areas are seen; namely, a small, central portion, the pith, made up of soft tissue; an outside, more or less corky covering, the bark, for purposes of protection; and, the wood, which is the hard tissue making up the greater part of the log and extending from bark to pith.

The pith is usually of very small diameter; it is rarely, as in Malapapaya (*Polyscias nodosa*. Seem.), greater than one centimeter. This fact is of importance because the pith is an element of weakness in the wood.

Sapwood and heartwood.—The outer part of the log is often of a much lighter color, less in specific gravity and much softer than the center. The distinct, central part of the log is known as the heartwood and this outer portion is termed the sapwood. Many woods do not show any heartwood. The relative amount of sap- and heart-wood is very variable according to the individual tree, the age and the part of the tree from which it is taken.

Pith-rays.—Radiating from the pith to the bark are connecting lines of soft tissue, the medullary or pith-rays. These are among the most important characteristics to be observed in the structure of a wood, since they have an intimate connection with both the strength and beauty. They differ in size in different woods, being very large and distinct in some, as for example in teluto (*Pterocymbium tinctorium* Merr.), catmon (*Dillenia* spp.), etc., and, in others, so small as to be invisible without the aid of a magnifying glass, as in acle (*Pithecolobium acle* (Blco.) Vid.), betis (*Illipe betis* (Blco.) Merr.), camagon (*Diospyros* spp.), or banaba (*Lagerstroemia speciosa* (L.) Pers.). The pith-rays may be all of the same size in the same tree, or there may be some large ones (the primary pith-rays) running from pith to bark, and some finer (secondary rays) starting beyond the pith. Compound pith-rays, where several are crowded together, may also occur. Pith-rays may take either a crooked or a straight course from the pith to the bark, but if curved, they usually are not abruptly so. The height of pith-rays is variable; they may be so short as scarcely to appear to have this dimension, or again it may be quite appreciable.

Growth rings.—The wood is formed in layers about the pith; and these may be formed only during certain seasons, the tree resting the remainder of the time. Where this is the case, each period of growth produces a ring about the pith. These rings are found in nearly all woods of temperate regions and in some of those of the Tropics. Where but one of them is formed during the year, it is called an annual ring, but manifestly, this name is not suitable for use with our woods, since we do not know whether one year sees the growth of one or of several. Consequently, the term annular, or seasonal growth rings has seemed preferable and will be used in this paper.

Seasonal rings seem to be characteristic of some of our woods only. It seems probable that the same species may have them when grown under one set of conditions and not under different ones. It also appears that many trees exhibit rings of seasonal growth when they are young but not afterwards. We have begun, in coöperation with the Bureau of Forestry, a series of observations on the manner and rate of formation of growth rings, but it will necessarily be some years before any safe general conclusions can be reached.

Distinct seasonal rings seem to be of constant occurrence in narra (*Pterocarpus* spp.), banaba (*Lagerstroemia speciosa* (L.) Pers.), calantas (*Toona* spp.), ipil (*Intsia* spp.), supa (*Sindora supa* Merr.), molave (*Vitex* spp.),

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and several other woods, but there seems to be a considerably greater number where they are not so.

False seasonal rings.—A number of woods show distinct, concentric lines bearing a strong, superficial resemblance to seasonal rings. These false rings may be caused by lines of soft tissue, as is the case in dita (*Alstonia scholaris* R. Br.) and palo maria (*Calophyllum* spp.), where they are so close together as to make it unlikely that they will often be mistaken. Lines of whitish resin-canals often give the appearance of seasonal rings in lauan (*Shorea* spp.), apitong (*Dipterocarpus* spp.), yacal (*Hopea* spp.), guijo (*Shorea guiso* Bl.), etc. These may readily be distinguished from the true seasonal rings by their irregularity of occurrence and by the fact that they usually fade out before completely encircling the log, and where they are numerous some of them can usually be seen to do this even in a small piece.

Vessels.—Fine, tubular passageways are found in all of these woods; in observing the end view of the log they appear as pores or sieve-like openings.

Concentric lines of soft tissue are found in some woods. These may be fine or coarse, wavy, broken, or straight. They are of very constant occurrence and serve clearly to delimit certain groups. The size, number, and arrangement of the vessels as well as the relation of the soft tissue and vessels to each other and to the pith-rays is very important.

PLANES OF SECTION.

Each wood should be observed in the following three planes of section:

Cross section.—Any section directly across the stem at right angles to the direction of growth; in this the pith-rays appears as long lines from pith to bark.

Tangential section or slab cut.—Any longitudinal section parallel to the bark and at right angles to the pith-rays. This is the one used in making ordinary, cheap planking, and it shows what is known as the cat-faced or bastard grain. In this plane of section the vessels appear as long lines through the wood and the pith-rays are seen in end view.

Radial section.—Any longitudinal section parallel to the pith-rays. Here the pith-rays appear as flat, expanded surfaces and the vessels as long lines; the timber so cut is known as quartered or rift-sawed, and has the beautiful silver grain which is familiar to most users of wood. This is the best method of cutting to secure the maximum of beauty and strength, but the tangential cut is much the easier to make, as it necessitates less handling and involves less waste; however, it gives an inferior timber.

GRAIN.

This is the figure presented by the structure of the wood. It is fine or coarse, straight or crooked, according as the elements of the wood are coarse or fine, crowded or loosely put together, straight or twisted. The best grain of the wood is brought out by careful attention to the cutting. The occurrence of a knot or branch, an irregularity in the trunk or root, or some local imperfection in the wood, may produce a regional modification of the grain, causing what is known as curly, or bird's-eye grain, or burl. Specimens showing the latter are at times very pretty and are much prized for certain classes of furniture. One of the best-known modifications of the grain is found in the large buttresses or buttress roots of some of our trees; some of these are of sufficient size to furnish single-piece table tops. Narra (*Pterocarpus* spp.) is probably the most widely known for this purpose, but we have a number of different trees showing this habit. Tindalo (*Pahudia rhomboidea* Prain), palo maria (*Calophyllum* spp.), tanguile (*Shorea polysperma* (Blco.) Merr.), calantas (*Toona* spp.) may be mentioned among the trees showing the fancy burl or bird's-eye grain.

Spiral grain.—A tree in growing often takes a spiral direction as indicated by the twistings of the bark; this gives the grain a spiral twist and the wood, in splitting, shows a series of flutings. A moderately pronounced spiral or twisted grain is evident in a number of our woods which show a resistance to smoothing in planing and working. When planed in one direction, portions of the surface are smoothed and certain others are roughened, and when the operation is reversed, the smooth surface becomes roughened as the rough surface is smoothed. This irregularity of grain is often noticed in amuguis (*Koordersiodendron pinnatum* Engl.), lauan (*Shorea* spp.), guijo (*Shorea guiso* Bl.) and mayapis (*Anisoptera* spp.).

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(b) *Minute Anatomy.*

Elements.—The elements making up wood are, vessels or tracheæ, tracheids, wood-fibers, pith-ray cells, and wood parenchyma cells.

Tracheæ, vessels, or *pores* are long tubes extending through the wood for some distance. Their size, arrangement in rows or scattering, and their relation to other elements are of great importance in the classification of woods. Large vessels are found in calantas (*Toona* spp.), lauan (*Shorea* spp.), and batitinan (*Lagerstroemia batitinan* Vid.); very small ones in bolongeta (*Diospyros* spp.), calamansanay and mancono (*Xanthostemon verdugonianus* Naves).

Wood-fibers.—These are long and slender, thick-walled cells, containing lignin in their walls. Their abundance and the thickness of their walls is usually sufficient to account for the weight and hardness of the wood.

Tracheids.—These are elongated, tapering cells, not so thick-walled as the wood-fibers, of relatively greater diameter, with walls more pitted and shorter.

Pith-ray cells.—These are short, prismatic, thin-walled cells containing starch grains, resin, or other deposits; they are nearly always with their long axes horizontal.

Wood parenchyma.—This is formed by thin-walled, prismatic cells, with starch or other inclusions. The cells are scattered with more or less regularity through the wood; the long axes being vertical. The wood parenchyma in some woods is arranged in fine, concentric or wavy, broken lines. These are usually of a lighter color than the surrounding tissue.

Pith-rays.—These are usually made up of unlignified cells and extend in a radial direction.

Resin-canals.—These are passages lined with thin-walled cells which secrete a resin which is often found exuding from the cells into the central passage, or completely filling it. Resin-canals are found in but few of our woods; for example, Benguet pine (*Pinus insularis* Endl.), lauan (*Shorea* spp.), apitong (*Dipterocarpus* spp.), yacal (*Hopea* spp.), tanguile (*Shorea polysperma* (Blco.) Merr.), guijo (*Shorea guiso* Bl.), mangachapuy (*Hopea acminata* Merr.), mayapis (*Anisoptera* spp.).

Deposits in vessels, etc.—The nature and color of the deposits in the vessels of certain woods is a distinctive character. Thus ipil (*Intsia* spp.) is distinguished by the sulphur-yellow deposits in its vessels; acle (*Pithecolobium acle* (Blco.) Vid.) and catmon (*Dillenia* spp.) by white ones; lumbayao, calantas (*Toona* spp.), and duguan (*Knema* and *Myristica* spp.) by red deposits; ebony, camagon (*Diospyros* spp.), and bolongeta by the very dense, black deposits in all of the wood elements of the heartwood; palo maria (*Calophyllum* spp.), betis (*Illipe betis* (Blco.) Merr.), and bansalaguin (*Mimusops elengi L.*) have pale-yellowish deposits in the vessels.

2. PHYSICAL AND CHEMICAL PROPERTIES OF WOOD.

PHYSICAL PROPERTIES.

Color.—The heart- and the sap-wood are often very widely different in color. Usually, the former is very much darker than the latter and the line of demarcation between the two is often very distinct. In some cases, such as agoho (*Casuarina equisetifolia* Forst.) the heart is only different in degree from the sap, being only a few shades darker in color and showing a gradual change from sap- to heart-wood. In other instances there is no heartwood, the color being the same throughout; examples are dita (*Alstonia scholaris* R. Br.) and lanete (*Wrightia* spp.).

There is usually some range of color within a species, but still not so much as to prevent the recognition of the characteristic color. Moreover, in some species there is the greatest latitude of variability. In narra (*Pterocarpus* spp.), for instance, three colors of wood, respectively known as white, yellow, and red narra, seem to be obtained from the same species.

Color may be due to deposits in vessels, parenchyma and pith-ray cells, or to the presence of some pigment in all the elements of the wood. In calantas (*Toona* spp.), the elements all contain a certain amount of pigment and there is also the red-colored substance in the vessels. The black color of camagon (*Diospyros* spp.), bolongeta (*Diospyros* spp.), and ebony (*Maba buxifolia* Pers. and *Diospyros* spp.) is caused by a compound of tannic acid which fills all the elements of the heartwood.

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Odor.—Certain woods are recognizable by their disagreeable odor, as, for example, cupang (*Parkia roxburghii* Don.) and Eugenia sp. Calantas (*Toona* spp.) has an odor resembling that of cedar; narra (*Pterocarpus* spp.), a sweetish cedary, and teak (*Tectona grandis* L. f.) a distinctly aromatic odor. Others of our woods have their peculiar odors, which, though fainter and difficult of description, are yet distinctive.

Taste.—A number of our woods may be recognized by their bitter taste; among these are anubing (*Artocarpus* spp.), batino (*Alstonia macrophylla* Wall.), betis (*Illipe betis* (Blco.) Merr.), bansalaguin (*Mimusops elengi* L.), dita (*Alstonia scholaris* R. Br.), and yacal (*Hopea* spp.).

Weight and specific gravity.—We have quite a large number of heavy woods, although perhaps not so large a proportion as is found in some other tropical countries. I have classified our woods as very heavy, heavy, moderately heavy, and light, following the classification used by Gardner.[a] We have many woods which when green will sink in water, but the number of these which has a greater specific gravity than water when dry is relatively small. The following table gives a list of Philippine and American commercial woods, with their weight and specific gravity so far as known.

The heavy woods which are italicised frequently come into the "very heavy" class.

Comparative weights of Philippine and American woods.

PHILIPPINE WOODS.

Very heavy.	Heavy.	Moderately heavy.	Light.
Sp. gr., 0.90 or more.	Sp. gr., 0.70–0.90.	Sp. gr., 0.50–0.70.	Sp. gr., 0.50 or less.
Weight.—Metric system, 900 kilos or more per cu. m.; English system, 56 lbs. or more per cu. ft.; Spanish system, 42 lbs. or more per cu. ft.	Weight.—Metric system, 700–900 kilos per cu. m.; English system, 44–56 lbs. per cu. ft.; Spanish system, 32–42 lbs. per cu. ft.	Weight.—Metric system, 500–700 kilos per cu. m.; English system, 31–44 lbs. per cu. ft.; Spanish system, 23–32 lbs. per cu. ft.	Weight.—Metric system, 500 kilos or less per cu. m.; English system, 31 lbs. or less per cu. ft.; Spanish system, 23 lbs. or less per cu. ft.
Mancono.[b]	*Duñgon.*[b]	Narra.[b]	Lauan.[b]
Duñgon-late.[c]	*Ipil.*[b]	Acle.[b]	Baticulin.
Ebony.	Molave.[b]	Teak.[c]	Calantas.[b]
Camagon.	*Yacal.*[b]	Guijo.[b]	Mayapis.[b]
Bolongeta.	Tindalo.[b]	Apitong.[b]	Red lauan.[b]
	Betis.[b]	Amuguis.[b]	Dita.[c]
	Bansalaguin.[b]	Pale maria.[b]	Cupang.[b]
	Supa.[b]	Banaba.	Teluto.
	Macaasin.[b]	Bancal.[c]	Malapapaya.
	Batitinan.[b]	Anubing.	
	Aranga.[b]	Tamayuan.	
	Sasalit.[b]	Sacat.[b]	
	Liusin.[b]	Malasantol.[b]	
	Tucan-calao.	Balacat.[b]	
	Alupag.	Malugay.[b]	
	Catmon.[b]	Banuyo.[b]	
	Agoho.[b]	Tanguile.[b]	
	Calamansanay.	Lanete.	
	Mangachapuy.[b]	Duguan.	
	Batete.	Santol.[c]	
	Lanotan.[b]	Nato.	
		Dalinsi.	
		Calumpit.	
		Talisay.[c]	
		Balinhasay.	
		Lumbayao.[b]	
		Batino.	

[a] Bur. For. Bull., Manila (1907), 4, 51.
[b] The specific gravity of these woods was obtained from tests made in Manila.
[c] These woods were grouped by data found in Gamble's Manual of Indian Timbers.

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Comparative weights of Philippine and American woods—Continued.

AMERICAN WOODS.[a]

	Hickory. White oak. Red oak. Persimmon. Osage orange. Black locust. Hackberry. Blue beech.	Ash. White elm. Sweet gum. Hard pine. Cherry. Birch. Maple. Walnut. Sour gum. Coffee tree. Honey locust. Tamarack. Douglas spruce. Western hemlock. Soft maple. Sycamore. Sassafras. Mulberry.	White cedar. White pine. White spruce. Bald cypress. Red cedar. Hemlock. Redwood. Oregon pine. Basswood. Chestnut. Butternut. Tulip. Catalpa. Buckeye. Poplar. Willow.

[a] The classification of American woods was taken from Roth's Bull. Timber, U. S. Bur. of Forestry (1895), *10*.

Resonance.—We have no commercial wood in the islands which is suitable for making good sounding boards. Imported coniferous wood is usually used for this purpose in guitars and other stringed instruments of local manufacture, the backs and sides of the instruments being made of lanotan (*Bombycidendron campylosiphon* (Tcz.) F. Vill.), lanca (*Artocarpus integrifolia* L. f.) or other even-grained ornamental woods.

Moisture content, shrinkage, seasoning.—Wood is much heavier when green than when dry, because of the large amount of water which it contains; air-dry it still holds 8 to 10 per cent of moisture and even when it is kiln-dried there is usually some water left in it. It is exceedingly hygroscopic; a piece which has been very thoroughly dried will, if placed in a moist place, take up enough water to equalize its moisture content with that of the surrounding air. This capacity for taking up water is responsible for the swelling and warping of timber. The loss of water from the wood causes shrinkage and where this is uneven, checking.

Seasoning.—The process by which water is gradually removed from wood is known as seasoning. In seasoning, certain chemical and physical changes take place which render the wood stronger, more durable, and usually harder and heavier. The nature of these changes is rather imperfectly understood, but it seems probable that certain materials contained in the pith-ray and wood parenchyma cells become changed into tannins, resins, and other substances which have a preservative and strengthening effect. When properly seasoned a wood is always stronger than it is when unseasoned. There may be several kinds of seasoning, as follows:

Natural seasoning taking place in the tree.—This results in the formation of heartwood by the means already indicated. A loss of water occurs simultaneously with the chemical change taking place, and the deposit of certain substances in the cells more than counterbalances the loss in weight, so that the heartwood is specifically heavier, although lower in moisture content, than the sapwood. This change from sap- to heart-wood is very important in considering the value of a timber. Sapwood seems incapable of equaling heartwood, no matter how carefully it may be handled after leaving the tree.

Artificial seasoning.—In the standing tree: In some cases, as for instance in the teak forests in India, the tree is girdled and then left on the stump for a year or more before being cut. It is claimed that the disadvantages of this method are that the resulting wood is more brittle than it if it seasoned in the usual way, and moreover, during the process it is more exposed to the attacks of burrowing insects. To offset this there is the advantage of rapid seasoning, with but little checking. For some species this is probably the best method.

In the log: Material left to season in the log usually becomes noticeably checked. Rapid seasoning is most safely accomplished in pieces of small dimensions.

By air-drying: The greater part of our material is air-dried—that is, seasoned by standing in piles of lumber exposed to the air. If properly piled, the process will proceed at a fairly rapid rate and the checking will be very slight. The pile should be so arranged that the air can reach the wood from all sides.

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By kiln-drying: This is accomplished by means of a controlled supply of artificial heat. Kiln-drying is resorted to whenever it is desired to reduce the percentage of moisture below that of air-dry wood or whenever especially rapid seasoning is required. If the operation is carefully performed, the wood is seasoned with a minimum amount of checking; it is made stronger and is less liable to decay. Of course, kiln-dried wood will take up moisture from the air, but it will not absorb it in as great quantity or as rapidly as the air-dried material; therefore, it actually remains drier than wood which has been seasoned in the air. The best results are obtained by prolonged and careful air-drying, followed by kiln-drying. If properly handled, wood is always improved by being kiln-dried. Unfortunately, the process is not as much practiced with the native woods as it should be.

Seasoning in fluids: Timbers sometimes are submerged in sea water for years before being dried, additional strength and durability apparently being given to them. For many years this has been the process with oak used for shipbuilding in England. Of course this method of seasoning can only be employed where the material can be so submerged as to be free from teredo attack. Timbers occasionally are encountered which have had a part of their seasoning in fresh water or in the mud at the bottom of fresh-water streams or lakes, an example being the swamp cypress logs which are raised from the mud of rivers and bayous in the southern United States, after having lain there for many years.

Small pieces of woods for certain purposes are *seasoned in oil or other fluids.* All these methods of submerging woods during seasoning have the very great advantage that the process is thereby made a very gradual and uniform one, checking being reduced to a minimum. However, these methods are suited only to special cases.

Heating power.—This varies the content of carbon and contained resins, oils, etc. Our best firewoods are usually those with very thick, dense cell-walls.

CHEMICAL PROPERTIES.

It is not the intention here to treat of the chemical composition of wood or of its behavior under any but the simplest reagents. However, there are a few very simple tests which may aid in the determination of particular woods and these are included here:

Molave (*Vitex* spp.) turns to a bright greenish-yellow when treated with an alkaline solution; narra (*Pterocarpus* spp.) gives a fluorescent, blue color to water; betis (*Illipe betis* (Blco.) Merr.) or bansalaguin (*Mimusops elengi L.*) will form a lather if the surface of the wood be rubbed with water or saliva; calumpit (*Terminalia edulis* Blco.), dalinsi (*T. pellucida* Presl.), sacat (*T. nitens* Presl.), or talisay (*T. catappa* L.) will color water a dirty, straw-yellow; catmon (*Dillenia* spp.) causes water to become pale red.

Others of our woods will doubtless also be found to give distinct reactions with simple reagents.[a]

3. DURABILITY AND DECAY.

Fungi and bacteria.—These grow abundantly in warm and moist situations. Wood which is partly submerged, or in contact with the ground, is most subject to the attack of these organisms, a continual supply of moisture favoring their development. Piling, railroad ties, and portions of buildings in contact with the ground give the best illustrations of destruction by these means, but while wood is always liable to damage from these causes, they are not the most serious considerations in this climate.

Beetles.—Woods frequently are encountered which are completely riddled by the burrows of wood-boring beetles; these extend in all directions and very perceptibly weaken the wood. The presence of beetles is indicated by the open burrows or by fine wood dust pushed out from them. It is said that no woods are entirely immune from beetle attack. In the very hard woods, however, it is usually only the sapwood which is affected. Logs left in the forest or piled with beetle-eaten material are most subject to attack. Certain woods, such as

[a] A discussion of the mechanical properties of wood is given in Timber, Bull. 10, U. S. Bur. For., and for a discussion of the mechanical properties of Philippine woods the reader is referred to Gardner, Bull. For. Bur., Manila (1906), 4, (1907), 2d edition.

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dita (*Alstonia scholaris* R. Br.) and lanete (*Wrightia* spp.), are particularly liable to be damaged in this way. No entirely satisfactory means of preventing beetle attacks has as yet been found.

Anay or "white ants."—Termites, very generally known in the Islands as *anay*, destroy a great many of the softer woods, completely hollowing them out until only a shell is left.

Shipworm or teredo.—This is the most serious enemy to piling, boat keels, and other wooden articles which are immersed in sea water. The work of these small animals constitutes so serious a nuisance as to render any but a very few of our very hard woods useless for piling.

IMMUNITY FROM ATTACK.

Hardness.—A few woods, such as mancono (*Xanthostemon verdugonianus* Naves) for piling and molave (*Vitex* spp.) for house construction, seem to be immune from attack because of their hardness. As a rule the hardwoods are very much freer from insect and teredo attack than are the soft kinds.

Taste and odor.—It seems probable that some woods may be safe from insects because of a taste or odor which is not agreeable to the invaders. This is supposed to be the case with calantas (*Toona* spp.).

IMPREGNATION AND OTHER ARTIFICIAL MEANS OF DEFENSE AGAINST INSECTS AND TEREDO.

Creosoting.—Creosoting, in the very few cases in which it has been tried in the Islands, has been very satisfactory, but it can not as yet come into common use because of the present prohibitive cost of creosote in Manila.

Impregnation with mineral salts may prove effective, if some way can be found of precipitating the salts in the wood so that they will not leech out under the action of this moist climate.

Painting a wood has proved effective so long as the painted surface does not become cracked.

There is further need of experiment to determine what Philippine woods are most immune to insect and teredo attack, and what are the best artificial means of defense.

USES OF PHILIPPINE WOODS.

While complete tests have not been carried out for any Philippine woods, certain of them have been found to be particularly well fitted for especial uses, and the effort is here made to group the woods of commerce according to their use.

1. *In places exposed to salt water and teredo attack.*—For piling: Liusin, betis, aranga, mancono, banaba, batitinan, bolongeta, dufigon, dufigon-late, mangachapuy, molave, and yacal are used; but the first four mentioned give the best satisfaction.

In addition to these there is agoho, which by its great hardness and its normal, tapering shape seems to be well fitted for piling. It seems not yet to have been tried for that purpose.

For ship and boat building: Teak, usually of the first importance as a shipbuilding wood, is of small importance in the Philippines because of its very restricted occurrence. It is obtainable only in small quantities.

For keels and other parts of ships exposed to salt water: Aranga, banaba, bansalaguin, betis, dufigon, guijo, liusin, molave, narra, palo maria, and yacal are used.

For small boats, bancas, cascoes, etc., a large number of different woods are employed, among which are: Apitong, amuguis, bancal, banuyo, calantas, white lauan, lumbayao, malasantol, malugay, mangachapuy, and tanguile.

2. *In places where the wood is in contact with the ground.*—For corner posts of houses (*harigues*): Molave, ipil, acle, agoho, alupag, anubing, aranga, banaba, bansalaguin, banuyo, batitinan, betis, calamansanay, dufigon, dufigon-late, liusin, macaasin, mancono, mangachapuy, narra, palo maria, sasalit, supa, tamayuan, tucan-calao, yacal.

For railroad ties: Molave, ipil, acle, betis, aranga, dufigon, yacal, tindalo, sasalit, supa, anubing, banaba, bolongeta, agoho. In addition to these, the following have been recommended by the Forestry Bureau as worth testing: Toog, dao (*Dracontomelum* sp.), apitong, amuguis, banuyo, malaruhat (*Eugenia* sp.), palo maria.

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For paving blocks: Molave is the only native wood which is known to be satisfactory as a paving block. Several of the woods used for railroad ties should be tried for this purpose.

3. *For use as construction timbers.*—For heavy framing and general high-grade construction: Acle, agoho, alupag, aranga, banaba, bansalaguin, batitinan, betis, catmon, duñgon, duñgon-late, ipil, liusin, macaasin, mangachapuy, molave, narra, palo maria, sasalit, supa, tamayuan, tucan-calao, yacal.

For medium-grade construction: Annubing, lumbayao, guijo, malasantol, malugay, lanotan, calamansanay, banuyo, batete, apitong, amuguis, tanguile.

For light or temporary construction: Balacat, balinhasay, bancal, batino, calantas, calumpit, cupang, duguan, dalinsi, dita, lanete, white lauan, red lauan, malapapaya, mayapis, nato, sacat, santol, talisay.

4. *For use in making furniture and ornaments.*—For the better grades of furniture there are used: Tindalo, acle, palo maria, catmon, teak, supa, ipil, narra, calamansanay, banuyo.

Cheap furniture is made of guijo, bancal, apitong, calumpit, dalinsi, sacat, talisay, dita, santol, baticulin, batete, malugay. Tanguile, red and white lauan, apitong and lumbayao make cheap furniture of excellent quality.

Besides the above-mentioned woods the following are used in cabinet making: Anubing, aranga, banaba, bansalaguin, camagon, bolongeta, ebony, lanete, lanotan, macaasin, tucan-calao, yacal, narra. Lanete, molave, and santol are among the woods used for wood carving.

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COMPILATION OF NOTES AND REPORTS ON THE CONDITION OF AGRICULTURE IN THE PHILIPPINE ISLANDS.

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COMPILATION OF NOTES AND REPORTS ON THE CONDITION OF AGRICULTURE IN THE PHILIPPINE ISLANDS.

GENERAL CONDITIONS.

[From report of the Schurman Philippine Commission, 1900, vol. 4, p. 5.]

STATE OF AGRICULTURE.

Introduction.

GENERAL ASPECT.

Agriculture, the chief source of wealth and prosperity, the inseparable companion of the well-being of families and of the power of States, this branch of production, most intimately allied with the lot of the people, has not prospered in the Philippines as was to be expected, in view of the favoring conditions which exist in the soil and vegetation of the virgin land, which assist in the solution of such a great problem. In effect, the insular tropical climate of the Philippine Archipelago, with the various modifications of it caused by the topographical situation—the humid atmosphere on the one hand, and the diversity of soils due to mineral constituents and effluvial matter on the other hand, and finally the great wooded regions which have deposited upon the land during ages a thick coating of organic matter, a most desirable fertilizer of the soil—all this constitutes a union of conditions which make the Philippine land able to produce and multiply not only the productions of tropical climates, but also many others of temperate zones, if proper measures are taken.

For what reason is it, then, that the actual conditions do not correspond to such dispositions? The poorly developed agricultural condition is due to several causes. We will enumerate briefly the principal ones in the first of the three following chapters into which this part is divided. In the second chapter we will indicate the actual present condition of Philippine agriculture, and finally, in the third, we will consider certain means of improvement.

Causes of the slight development in agriculture in the Philippines.

SMALL POPULATION.

One of the first requisites for the cultivation of land, without which it is not possible to develop the soil in a rational manner, is the hand of man, and human labor must stand in harmony with all the other agents of production. The worthy cultivation of the soil is not possible if there is a lack of hands for the multifarious labors. This condition has existed in the Philippines. There has existed no proper proportion between its scanty population and the immense area of its territory. In 1810, by approximate computation, there existed in the archipelago 2,526,000 inhabitants. Among them were, Chinese mestizos,

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119,000; Chinamen, 7,000, and those of the white race did not exceed 4,000. As a matter of fact, but one-ninth part of the whole territory—3,267,000 hectares—was cultivated. Bearing in mind that the extent of Philippine territory is nearly equal to that of Italy, with 28,000,000 inhabitants; a little less than that of England and Ireland, with 32,000,000 inhabitants, and six times that of Belgium, with 5,000,000 inhabitants, the condition of the Philippines is conspicuous, presenting a virgin soil and an extensive territory to a population of scarcely 8,000,000.

SLIGHT ACTIVITY OF THE NATIVE RACE.

If, in connection with the scanty population, is taken into consideration the character of the Indian, it will be seen that the proverbial laziness of the native race has been no slight obstacle to advancement in agriculture, as in other directions. Content, as they are, with the most limited amount for sustenance, which, as a rule, they are able to gain without effort, they do not apply themselves to work and have none of the more lofty ambitions. They care naught for the morrow nor for leaving to their children and their heirs the means for enjoying a happy future. While there are honorable and frequent exceptions, increasing in number every day, it is none the less a fact that in general they refuse to eat bread won by the sweat of the brow, and this in spite of the fact that it is to agriculture the Filipino owes all there is of value in the general traffic of the islands; for, without taking into account the large interisland traffic and consumption of prime agricultural products, 90 per cent of its exportation, which exceeds 36,000,000 pesos annually, is composed of a few leading products of the soil upon which but little handiwork is spent, even in the case of manufactured tobacco. Indeed, up to the present time there exists no considerable branch of exportation which does not come from the vegetable kingdom, obtained in the first instance by field labor.

THE LACK OF WAYS OF COMMUNICATION.

No one is ignorant of the great advantages which means of communication afford to agriculture. It is indeed one of the chief conditions for the development of agriculture if there is any pretense of seeking rich results from it. Unfortunately, in the Philippines there are scarcely known other ways than the so-called general highways, and these in certain periods of the year are little less than impassable. Nor are there byways or anything deserving this name in the great majority of districts. Such byways, or secondary roads, are essential means of communication in agricultural districts; and for the farmer it is a necessity to be able to transport, without the destruction of his beasts of burden, the products of his lands to the markets where they will find best sale. Because of the lack of such ways of communication it results that the districts produce only that required for their own subsistence, leaving stationary the general march of agriculture and abandoning the elements of production which natural opportunity provides in a country naturally as fertile as the Philippines.

FAILURE TO TAKE ADVANTAGE OF THE WATER OF RIVERS.

A multitude of rivers, large and small, pass through the lands of the archipelago. They run along their great beds without, however, inundating their boundaries and fertilizing the country. With very slight cost, however, in many places they can be diverted and run into small canals, irrigating extensive tracts, which at the mouths of these rivers stand awaiting this kind of fertilization, thus transforming barren plains into beautiful and productive fields, in which can be raised a great number of plants that will greatly augment the wealth of the country. Many districts now lose crops and suffer hunger in consequence of drought because trusting solely to the water of rains, while having, nevertheless, in the neighborhood rivers which easily would furnish not only water for irrigation, but also fertilizing matter which they always hold in greater or less quantities. To a still less extent has the country taken advantage of the great power of flowing water as a motive force for the simple machinery used in production. In many rivers there are falls of water which, in addition to serving as irrigation for the district, could, with small cost, be turned to remunerative industrial development.

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IMPERFECTION OF AGRICULTURAL IMPLEMENTS.

The poor state of production in which the archipelago stands with relation to other countries depends further upon the deplorable systems of cultivation followed by its farmers. In the Philippines there is scarcely known, much less employed, a single one of the thousand well-perfected agricultural machines, the use of which in other countries is general, even among agriculturists least skillful. By reason of this all work is done in an imperfect manner, because in no other manner can work be done with the antiquated implements which are here used.

LACK OF CAPITAL.

The lack of proper capital and the high price asked for loans constitute another obstacle, which stupefies industry, augments the cost of production, and restrains, in consequence, its benefits. In order to till the soil capital is necessary, if not indispensable, and often can be reimbursed only at the end of years.

HAPHAZARD METHODS.

Vicious also is the general system of agriculture adopted and followed in this country. It neither suits the necessities of its inhabitants, much less nourishes and furthers commerce and industry, nor does it take proper advantage of the happy combination of soil, climate, and good distribution of waters which are at hand. The unenlightened method of cultivation of the fields employed is purely brutal; it being recognized that to till the soil, with proper fruit, there is more need of work with the head than with the hands. In a word, there is in the archipelago no system of agriculture, properly so called, and the greater part of the people have no idea of what agriculture really means. In a land like the Philippines, in which in every direction there grow spontaneously plants of commercial and industrial value, and of the best quality, how easy it would be to subject them to a cultivation which would greatly improve and proportion the products to a greater number of industries, which would give occupation to many hands in addition to those directly employed in agriculture. By the side of the agricultural population there would then grow up an industrial population which could make use of the products of the soil and in turn be a consuming class.

CONSEQUENCES.

To the defects enumerated is to be attributed the fact that the Philippines so long remain in the primitive agricultural condition in which, according to economists, the country produces only that which is strictly necessary for its own meager sustenance. The defects spoken of in the agricultural system lasted down to the time of Governor-General Basco, who, in 1782, decreed in certain provinces a monopoly and an enforced cultivation of tobacco, inaugurating by this scarcely equitable measure the agricultural progress of the country.

FUTILE EFFORTS OF THE ROYAL COMPANY OF THE PHILIPPINES.

Coincident with the decree above mentioned was established the Royal Company of the Philippines, with a large capital raised in Spain. Its principal object was to establish upon a large scale proper mercantile relations between the archipelago, East India, China, and the Spanish-American colonies. The business with the last-named countries consumed, however, a great amount of the capital and the greater part of the activities in the development of the agriculture of the archipelago. To this is due the attempts made to develop on a large scale the cultivation of cotton, pigments, cloves, cinnamon, coffee, cocoa, and the mulberry tree for the growing of the silkworm, and other products of the soil. But the general apathy that came, the lack of techincal knowledge on the part of subordinates, the privileges granted to shippers from Acapulco in hostility to those of the company, and, lastly, the strange privileges in business, amounting to a tacit, if not expressed, monopoly, conceded to the provincial governors, which lasted down to the year 1844, together with other causes, such as general backwardness and ignorance and the mercantile isolation of the country from other countries, were eventually the powerful means to nullify the high and patriotic projects of this company, causing its downfall, not, however, without leaving the seed of notable agricultural experiments, which later bore valuable fruit.

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STATISTICAL FACTS.

A few statistical facts will aid in the comprehension of the slight importance of Philippine agriculture in the first years of the present century. In the beginning of this century, the exterior commerce—exportation—of the archipelago amounted only to some 4,795,000 pesos, of which 2,800,000 was the export of coined silver, sent for the purchase of silk and cotton goods and other products in China and Hindostan. One million seven hundred and forty thousand pesos more were sent to America, leaving only some 500,000 pesos to represent the export of Philippine products, properly so called, such as rice, ebony, anneal, sugar, cotton, shell, birds' nests, horns, etc. So that it may be said that at the beginning of the century the total exportation of agricultural products of the Philippines scarcely amounted to 400,000 pesos annually.

Present state of agriculture in the islands.

In spite of the conditions which we have just noted, and due to the popularization of scientific theories and the stimulus which generally has been lavished upon agricultural industry, and the admirable development which every class of industry has received in other countries, there is beginning to be reflected the beneficent influence in the Philippine territory, and the stimulus produces excellent results. Science likewise lends its aid in agricultural undertakings, bringing practical ideas to the mind of the cultivator and arousing him from his old routine.

MODEL AGRICULTURAL BUILDINGS AND STATIONS.

In addition to the meteorological observatory of Manila, whose services to navigation, commerce, and agriculture are well known to all, various royal decrees have been passed relative to the development of agriculture in the Philippines. We here note the most important.

By royal decree of the 8th of July, in the year 1884, it was decreed that in the future the agricultural department should be independent of the inspection general of state lands and should remain in charge of an agricultural commission, whose organization, object, functions, and duties were determined in regulations approved by the sovereign. By these regulations there were intrusted to the commission the following duties: First, study of agriculture, animal production, and the means leading to their improvement; second, theoretical and practical teaching of agriculture and animal culture and its derivatives; third, preparation of statistical and descriptive documents with regard to said productions; fourth, building of edifices devoted to agricultural teaching; fifth, editing of monographs with reference to agriculture in the archipelago and with reference to industries created; sixth, zoological studies; seventh, the making of agricultural collections, properly classified, to be sent to the minister of ultramar, and local museums to be created.

By royal decree of the 26th of November, 1887, there was ordered the creation in Manila of a school of agriculture whose object was the theoretical and practical education of skilled farmers, the education of overseers, and the promotion of agricultural development in the Philippines by means of observation, experiment, and investigation. In virtue of these royal acts the School of Agriculture in Manila was opened on the 2d of July, 1889. There are, in addition, two courses in agriculture given; one in the University of Manila, and another in the Ateneo Municipal. There exist two model farms in the provinces of Pampanga and Visaya, and five agricultural stations in the islands, which are at the same time schools for overseers.

The technical work intrusted to the agricultural stations mentioned is the following: First, the determination and study of the physical properties of the tillable soils of the region; second, mechanical analysis of the same; third, physical-chemical analysis of the same; fourth, qualitative analysis of the same; fifth, analyses and experiments by the scholars, and their employment in actual practice; sixth, study of systems of irrigation, quantity and quality of water, epochs and times of irrigation best adapted to cultivation; seventh, analysis and study of seeds, methods of sowing and grafting; eighth, study and analysis of secondary products of agricultural products and their uses; ninth, experiments with classes of labor, and with machines and instruments best adapted to cultivation; tenth, experiments with new kinds of products, and studies of their adaptability and cultivation; eleventh, study of the climate

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and its action upon products, of the natural fertility of the soil, the assimilation of atmospheric and other elements, and the manner of changing them; twelfth, study of the expense and products of actual cultivation and of reforms in the economy of production; thirteenth, studies with reference to herds and their races, qualities, feeding, care, and the acclimatization of new species and breeds; fourteenth, study of agricultural industry, industrial products, machinery, and reforms in industrial methods; fifteenth, study of the diseases or pests affecting crops and animals and the means of combating them and conserving products; sixteenth, solution of all other problems of technical or economical character which affect, or may affect, the agriculture of the region.

The chief of this service, the professors of the school, and the directors of the farms and farming stations are required to be agricultural engineers, with skilled, graduated farmers for assistants.

In the year 1887 a beginning was made of this work on the model farm of the Visayan, established in the town of La Carlota (situated in the island and province of Negros), longitude 123° east of Greenwich, latitude 10⅞° north; height above the sea, 125 meters. It was established near the principal centers of cultivation of the archipelago. Its results have been recorded in a special publication.

The model farm of Luzon was established in the town of San Pedro de Magalang. It was situated in the province of Pampanga, longitude 120⅝° east of Greenwich and latitude 15⅛° north; height above the sea, 33 meters. On this farm there has been organized since 1888 a fold for the raising of horses of Arab breed for crossing with the horses of the island.

The five agricultural stations heretofore mentioned are as follows: First, that of Albay, in the province of the same name. It is situated in the southeast of Luzon 123⅛° east of Greenwich, 13° 09′ north latitude; height above the sea, 10½ meters. Second, that of Isabela Luzon, in the province of the same name, in the north of Luzon, 127⅝° east of Greenwich, 17° 36′ north latitude; height, 42 meters above the sea. Third, that of Iloilo, in the district of the same name, in the island of Panay, 122⅝° east of Greenwich, 10° 41′ north latitude; height, 8 meters above the sea. Fourth, that of Ilocos Sur, in the province of the same name, in the north of Luzon, 120⅛° east of Greenwich, 17⅝° north latitude; height, 15 meters above the sea. Fifth, that of Cebu, in the island of the same name, 123⅛° east of Greenwich, 10⅞° north latitude; height, 25 meters above the sea.

By decree of the general government of the islands, on the 22d of July, 1892, there was ordered the publication of a periodical, entitled Official Agricultural Bulletin of the Philippines, in which there should be published all the data relative to the work accomplished in the agricultural establishments mentioned; and by another decree, by the same authority, on the 3d of November, 1893, it was ordered that this periodical should begin to be published from the 1st of January, 1894. It began publication from the 1st of January, 1894, the chief of the agricultural service of the Philippines being director thereof, and the engineers and their assistants being the editors.

AGRICULTURE AND ANIMAL CULTURE.

Certain animals are intimately allied with agricultural production. They are so allied because without them agriculture could not easily progress, and because a certain number of the inhabitants must give them attention, and because they produce without much cost various articles for the laborer, and finally, because there are plants and products distinctly and only for their maintenance. Accordingly, after having set forth the principal vegetable products of the archipelago, we will speak briefly of herds and other domestic animals connected with agriculture.

PRINCIPAL VEGETABLE PRODUCTS OF THE ARCHIPELAGO.

In order to appreciate the actual agricultural condition of a country or region with respect to its products, it is sufficient to consider the most important. Although in the treatise on phytography it is set forth what are the principal crops of greater cultivation in the islands, nevertheless we will briefly enumerate them here, with some remarks.

Rice is the bread and principal sustenance of the natives. The land responds with wonderful fertility to the labor which the native puts upon it, rendering in good years from ninety to one hundred times the amount of rice sown. There

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exist more than 120 varieties of this grain, distinguished by color, size, taste, and adaptability. The ordinary price of rice, with its hull, called palay, at its place of production and in normal times, ranges from 6 to 7 reales fuertes per cavan (16 liters). The price of rice cleaned or hulled ranges from 15 to 16 reales per cavan.

The annual production of palay in the Philippines is some 17,000,000 cavans, but even this, united with maize, mangoes, and other food plants, does not suffice for the internal consumption, it being necessary to import from Saigon annually more than 1,000,000 cavans, of the value of 2,500,000 pesos on the average.

In certain Philippine provinces corn takes the place of rice as the staple article of food. Such is the case in Cagayan and Isabela de Luzon, where the cultivation of this product is alternated with that of tobacco.

Abaca (manila hemp plant).—Hemp occupies the chief place among fibrous and textile plants. Its enormous production has been limited to certain regions of the Philippine Archipelago, as all the attempts made to introduce its cultivation and utilization in Borneo, Sumatra, and other points have failed. It constitutes one-third of the Philippine exports, it having been remarked, according to statistics published in 1894, that from the year 1818 to the year 1894 the production and exportation of raw hemp has increased from the insignificant quantity of 13,883 kilograms exported in said year 1818 to that of 93,741,824 exported in 1893 and valued at 12,558,548 pesos, according to official custom-house statistics.

Cotton.—Some time ago cotton attained some importance in the Philippines, because it was the principal material of the domestic weaving industry, now reduced to very limited proportions on account of the competition of English and Spanish cotton cloths, which are imported to the amount of 5,000,000 pesos, and of the tax on looms.

"We have not the slightest doubt," says Dr. San Martin, who has written a valuable little book on the cultivation of cotton in the Philippines, "that with a good choice of lands, with the adoption of seed the best adapted to the quantity and quality of the cotton harvested, and principally with the use of American cotton-working machines, either worked by hand or by any kind of motor, and without omitting anything essential, the greatest success would crown the work undertaken by cotton raisers. The sale of the product on favorable terms would be sure in Manila itself, where the certainty of having good cotton in abundance would probably lead to the immediate establishment of spinning factories, and possibly of weaving factories also. Now that sugar is in a miserable state at present and has a future precarious and sad enough, it would be well for agriculturists and merchants to think of the great advisability of establishing cotton plantations. * * * An annual importation of more than $800,000 in cotton threads and of $7,000,000 to $8,000,000 in cotton goods we believe offers a broad field for competition to a Philippine agricultural and manufactured product of this most valuable textile material."

Sugar.—For a long period this was the chief article of export and one of the principal Philippine products. Afterwards the demand for the production of hemp grew in importance until it was placed at the head of our exportations, while, with rare turns of rising, the demand for Philippine sugar diminished. In the period from 1889 to 1893 the average sugar exportation amounted to about 11,500,000 pesos.

Three enemies as cruel as persistent mainly conspire to kill the exportation of Philippine sugar, and they are: Beet-root sugar, high freights, and the bad curing of sugar.

The very impure Philippine sugars contain great quantities of dregs and of vegetable acids already in a state of fermentation; which occasions a great loss of crystallizable saccharine substances in the refineries.

Tobacco.—Philippine tobacco represents now substantial wealth and a flattering future, because the tobacco business rests upon a solid basis, which is the excellence of the leaf, only excelled in the whole world by the justly celebrated Havana tobacco. For the present, limiting ourselves to the prepared leaf, or leaf tobacco, we shall say that from 552,000 pesos' worth exported in 1884, the exportation during the past five years has risen to about 2,000,000 pesos, without counting the value of manufactured tobacco, which is considerable.

These figures and this gradual increase observed in the exportation of our tobacco in the midst of the general crisis through which almost all the producing countries have been passing, overwhelmed with stocks larger than the demands of universal consumption, offer a legitimate and very pleasing outlook

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for the Philippines, because they clearly demonstrate that the only reason for this increasing demand for our tobacco is its marked superiority.

Indigo.—For many years Philippine indigo, especially that of Laguna and of Ilocos, was the worthy rival of that from Guatemala, which is considered the best in the world. But on the one hand the deceptions practiced blindly and avariciously by the Chinese traders, in whose hands this valuable trade had been, and which was discredited in consequence, and on the other hand the application to dyeing of aniline dyes extracted from coal tar, very cheap and with magnificent colors, although not very permanent, were potent reasons for diminishing to a great extent the demand for Philippine indigo.

In 1893 107,000 kilograms of solid indigo, valued at 85,000 pesos, were exported, and of liquid indigo 276,000 kilograms, valued at 13,500 pesos.

Cocoa.—Cocoa is a delicate plant, and although it is found in small quantities in several provinces of Luzon and Visayas, where it prospers best is in southern Mindanao and in the district of Davao, where it is produced in greater abundance and of better quality. The production is limited and is estimated to be some 2,000 piculs, which are consumed in the archipelago. The first cocoa plants in the archipelago are due to Father Juan de Ávila, of the Society of Jesus, for he used his influence with the Governor Don Diego de Salcedo to get from New Spain some living plants of cocoa, which he planted and cultivated with the greatest care in Ilog, capital of the island of Negros, where he then lived. (P. Delgado, S. J.)

Coffee.—Coffee was until a short time ago a very widely distributed product, which was found in the provinces of Laguna, Tayabas, Cavite, and especially in Batangas, which was the chief center of its production. Philippine coffee may be compared to that of Java and Martinique, but there are some localities where, according to experts, it is produced equal to that of Mocha. The statistics of the years 1887 and 1888 give a production of coffee in all the islands of 115,000 piculs, some 100,000, valued at ₱2,000,000, being exported, half of this exportation going to Spain and the rest to China, British India, and Japan.

In order that Philippine coffee may compete in the markets of the world with similar American products it only lacks perfection in shelling and polishing, which deficiencies can be easily remedied by apparatus suitable for correcting those defects.

For some time past the production of coffee has been diminishing to such a degree that during the year 1893 only 374 piculs of this valuable article were exported. The cause of this decadence is the destruction caused in the plants by an insect of the genus Xylotrechus, and by a fungus of the genus Peromospera.

Cocoa palm.—This is a tree of inestimable value, because everything can be used, as we have said, in the proper place. It abounds in all the archipelago, and its fruit, the cocoanut, is exported to France, Spain, England, and China to the value of $675,432; and the oil only to China to the value of $15,445. It is generaly exported in the form of copra.

STOCK RAISING.

In view of the vast plains which could be used for grazing, the herding industry leaves much to be desired in the archipelago.

Horses.—Most of the horses in the Philippines came from Mexico, Spain, and China. They are small and have hard hoofs, as mentioned in the zoography. The Indian does not take the care of them that such noble animals deserve; they make them work before they are full grown and overwork them in their races. The provinces which have the best horses are Batangas and Pangasinan. They are plentiful, but more delicate, although better adapted to racing, in Ambos Camarines, Albay, and Sorsogon. Those of Ilocos are small, but strong. In Visayas the Mindoro horses are renowned, and they abound in Negros, Cebu, Iloilo, and Leyte. The horses of Mindanao and Jolo are very good and of good height, but rather wild; they are quite abundant in the districts of Misamis and Cotabato.

Buffaloes.—These cattle are represented by the carabao or buffalo (*Bubalus buffelus* L.) of the bovine family. It is the most remarkable quadruped which the Spaniards found in the Philippines. There are few animals so ugly, but few more useful for agricultural purposes, especially in the Philippines, where it could not be replaced. It is black, or dark brown, its coat of hair being very streaked, its horns large, curved, wide, and rough; the head small in comparison

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to the large body. It has great strength in drawing heavy burdens, but its gait is slow and its movements sluggish. On account of its great resistance to the heat of the climate and the great ease with which it fords large rivers and works the marshy lands, in which all parts of the archipelago are converted during the rainy season, it is invaluable. The buffalo is also indispensable in the Philippines, because without it it would be impossible to travel through many regions, especially in the rainy season. It begins to work when 4 or 5 years old, and lives until 30, and its horns and hide are very useful. The buffalo is uniparous, has an ugly appearance, a good scent, and excellent hearing. It eats much and needs to drink often. It is supposed that there are a million and a half head of these cattle.

This animal is the most abundant and the best developed in the country; it is almost the only animal used in agricultural work, and as a beast of burden. The provinces where most are bred are Pangasinan, Pampanga, Albay, Laguna, Morong, and Zambales, in Luzon. In Cebu, Iloilo and Negros, in Visayas, and in Mindanao, in the districts of Misamis and Cotabato.

The wild mountain buffalo in a savage state is to be feared. Meeting with it in the forests is really dangerous for men.

Neat cattle.—This species does not belong to the Philippines, but came from Mexico and China, and is not as useful as in other countries. Ordinarily it is only raised for beef. In some provinces they are beginning to use oxen for field work and as draft animals.

The best neat cattle and the most abundant are found in the province of Batangas, where they substitute the buffalo in a great measure for field work. They are also plentiful in Mindoro, Masbate, and Ticao, from which islands the dealers of Manila are supplied. There are also good cattle ranches in the island of Tabiliran, northern Luzon, in Calamianes, and Benguet. In Visayas neat cattle abound in Negros, Cebu, and Iloilo, and in Mindanao, in the districts of Misamis and Cotabato.

Sheep.—These animals do not prosper in this archipelago, and there are very few and miserable specimens of this most important kind of cattle.

Goats.—These are bred to a certain extent, especially in the mountains. The provinces where there are most are Batangas, in Luzon, in Visayas, Cebu, Iloilo, and Leyte, and in Mindanao, in the district of Misamis.

Pigs.—These are more abundant and of more utility in the Philippines than the two previous classes. The Philippine swine are of Chinese breed. Their principal use is that of the breed, that is to say, for making lard. In small towns, and even on the outskirts of large ones, almost all the inhabitants raise pigs. The provinces where there are most are in Luzon, Batangas, and Pampanga, in Visayas, Cebu, Iloilo, and Samar, and in Mindanao, Misamis, Cotabato, and Zamboanga.

Domestic fowl.—Chickens abound throughout the archipelago, but they are only raised on a small scale, and there are no special breeds which merit particular mention. Turkeys are also raised, but in the same way as chickens.

Ducks.—The ducks raised in the town of Pateros (near Manila), where all the inhabitants are engaged in this industry, deserve special mention. The breeding places are located on the banks of the Pasig River, in the form of yards fenced with bamboo cane about 1 yard higher than the level of the water, where the adult ducks pass the day. Near this there is another inclosure where there is less water, where they keep the medium-sized ducks or those beginning to have feathers. Behind these two inclosures there is another smaller one with a floor of woven cane or sanali, where the little or newly hatched ducks are kept.

The food of the little ducks consists of boiled rice, or morisqueta, and small crabs. The larger ones are given palay, or rice in the husk, and a small snail, called by the natives susó, which comes from Laguna de Bay.

In the duck houses, which are not far distant from the duck yards, there is the same separation. At sunset all the ducks retire in an orderly manner to their respective departments, to return to the yards at daybreak on the following day in the same order. It is hardly daylight when the bantay, or keeper, opens the doors. In the duck house there is a floor of rice husks 10 centimeters thick and a light burning all night. After the ducks are let out in the morning and fed their usual ration, the keepers gather the eggs laid by the ducks into little heaps of from five to ten. Those collected are taken to the general storehouse until the number necessary for one setting is collected.

Near the house of the proprietor, not far from the duck houses and duck yards, there is a house or room of bamboo and palm leaves, carefully built, and

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with as few apertures as possible—sometimes only that of the door of entrance. The interior walls are of bamboo or woven cane, and the floor is a thick layer of rice husks or ipa. Around the walls at the distance of a meter a sort of barrier is raised with woven cane (matting), and between this and the wall some baskets, called toangs, are placed to receive the eggs for hatching. The space between the wall and the barrier is filled with rice husks for the purpose of isolating the interior temperature of the baskets from that of the outside room.

At the entrance door of the room there is an iron boiler, wherein the rice husks, contained until then in bags of hemp cloth, are heated. When the husks are heated they are replaced in the same bags, near the baskets, or toangs, where are already prepared 1,000 eggs in the same number of bags as those containing husks, usually eight. A bag containing husks is then placed at the bottom of the basket without emptying it, and above it one of eggs, and so on in layers. The temperature is kept 36° to 37° C., and in order to do it the operation of heating the husks and returning them to the baskets is repeated every day, taking care to place in the bottom layers those eggs which were the day before in the top layers. After twenty-one days the eggs are taken out and put on tables in the center of the room. On each table 1,000 eggs are placed, arranged so that they touch each other, and covered with blue cotton cloths to protect them from the light and somewhat from the temperature of the room. The eggs have a temperature of 32° C., approximately, and are kept at this temperature for eight days, when the little ducks begin to hatch out everywhere. At this time the keeper, who during incubation sleeps alongside of the same table, gathers up the little ducks one by one and puts them in a broad basket of reeds or bilao, with straw, under the table, where they all perspire and dry off for one or two days. Thence they are taken to the small duck yard already mentioned. When they are grown the male ducks are taken to market, the females being kept for breeding purposes.

Means for the successful development of agriculture.

NECESSARY KNOWLEDGE.

Agricultural production is a vast problem, susceptible to an infinite variety of combinations and solutions, and in which a considerable number of elements, not only differing from each other, but variable, by reason of a multitude of accidental and unforseen circumstances, and which it is frequently difficult to appreciate and discern, enter, so that what is true for one locality is not true for another, what is good in this district and beneficial is prejudicial in another, what can be used with profit on one farm may possibly be ruinous on another neighboring one, what has turned out well one year may be a failure in the following, and, finally, what may give a profit at one time may by reason of this or that circumstance soon fail to give it.

In this state of things it is readily seen that it is impossible to take into account the infinitely changeable influences which in greater or less degree are involved in the phenomenon of agricultural production, both from the point of view of the laws of nature as well as from the standpoint of the mechanical and economical means to which it is subject at the will of man.

In order to properly work a farm to get out of it the crops it should produce, it is not enough to have a theoretical and practical knowledge of agriculture, it is necessary to add to it exact notions of the following points:

(1) The best system of cultivation to follow, according to the nature of the land, its location, and all the circumstances which may influence the growth of the products.

(2) The preference which should be given to certain crops which yield the most profit and which are best adapted to the nature of the land cultivated.

(3) The most economical methods of obtaining the greatest possible amount of crops.

(4) Finally, the best means of utilizing these products and getting from them the greatest net profit.

PROTECTION ON THE PART OF THE GOVERNMENT.

One of the duties most proper to a government and of great responsibility is the encouragement and protection it owes to agriculture, because from perfecting the same and the development of the arts necessary for the utilization of

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its products the welfare of a people is derived, a well-being which it is especially incumbent upon a government to promote. The Filipinos, with the elements contained in their soil, will be able when the time comes to devote themselves with much profit to all kinds of industries; but in order that these industries may have rational conditions of life and prosperity the first thing to do is to give the Philippines, by means of a good system of cultivation, agricultural industries.

By system of cultivation is understood the diverse processes which are employed for working arable land, harmonizing the forces of nature which work all the time and by themselves and those which, depending on man, he may use and direct as he pleases. According to this there must be many systems of cultivation, because there are many different ways of obtaining products from the soil. Left to itself, and therefore limited to the forces of nature, the earth becomes covered with wild vegetation destined, according to the quality and situation of the lands, to form meadows or forests, which in a certain way may be made to alternate with products obtained by the work of cultivation. The choice of a system of cultivation is one of the things which should most attract the attention of the agriculturist. To determine with probabilities of certainty what may be the system of cultivation best suited to a farm there is necessary (1) exact knowledge of the nature of the land; (2) of the influence its location may have on its vegetable products; (3) of the means at one's disposal.

MEANS OF COMMUNICATION.

Having perfected the methods of cultivation and the development of agricultural production, the Government should utilize the proceeds of taxation by inaugurating the construction of good cart roads, establishing a good system of neighborhood roads, and undertaking canal works, which fertilize the lands, give an outlet for its products, life to internal traffic, and food to external traffic. In this way abundance, cheapening the products of the soil, will increase the wealth of the country without detriment to the laboring classes. Ease of communication and the proximity of places where the cultivator can dispose of his goods are a real and positive advantage which can not fail to enter into consideration and to powerfully influence the value of a piece of arable land. It is never well to lose sight of the capital represented by herds and animals used for transporting farm products to market, whose cost should be deducted from the proceeds of the sale of these same products. In this connection, those agriculturists do not calculate well who are accustomed to transport the products of their farms for a long distance in order to get a profit which is apparently greater but in reality much less than the expenses occasioned by the journey.

COMBATING FALSE NOTIONS.

If agriculture in the Philippines is to reach the state of prosperity of which it is susceptible, it is necessary for the Government to duly foster the diffusion of agricultural knowledge and cause this empiricism, which nullifies with its tenacious opposition to every sort of improvement the natural fertility of the Philippine soil, to disappear. Wherever the sight rests in the Philippines the fatal results of this empiricism, the inevitable consequence of indifference, are seen. Cultivation in a miserable state, on account of the lack of well-directed labor; weak and degenerate stock. These are the two industrial elements which separately, as a rule, dispute the development of this territory. Outside of a more or less circumscript radius around the great centers of population, in which there is more or less local consumption, but always of some importance, it is a chimera to expect large profits for the cultivator and improvements in the agricultural art, without machines, which simplify and cheapen labor; without live stock, which at the same time that they supply the motive power economically and plentifully for said machines, also furnish the manure so necessary to all agricultural development.

INTRODUCTION AND PROPAGATION OF NEW PLANTS.

The introduction of new plants and their propagation throughout the provinces is advisable, such as that of the mulberry tree, which formerly gave such good results in the silk industry. It would be advisable likewise to culti-

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vate the nettle for the valuable fibers and sorghum for alcohol and sugar. Many oleaginous and dyeing plants and even sugar cane would give larger and better crops with better means and careful processes in the different operations of the respective industries. The use of fertilizers, almost unknown to the natives, should be introduced. The many places that are not used for anything should be made use of for herds of horses and cattle.

SPECIAL REMARKS.

One of the first measures which should be taken is the increase of the number of model farms and agronomic stations, so that the agricultural necessities of all the archipelago may be studied in a perfect manner, because the climatologic and telluric conditions are as different as the islands are different which compose this extensive archipelago.

The island of Mindanao, where all the most important products of the archipelago can be easily cultivated, and where on account of the lack of population they can not be taken advantage of, demands special attention on the part of the government. To this end, it would be advisable to plant in that region, besides a model farm with its corresponding agronomic stations, some private companies or societies of colonization and development, managed by persons of undoubted honesty and of competent knowledge for such business, for the ground is worth as much as the man.

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[From Report of the Schurman Philippine Commission, 1900, vol. 3, p. 244.]

CHAPTER I.

GRAMINEOUS PLANTS (GRASSES).

We include in this group species of the family of grasses which are of great interest in the Philippine Archipelago, serving as food for man and beast, and as articles of common use for the natives. Among these are rice and corn, grass and reed grass, and the common cane or bamboo.[a]

PALAY, OR RICE (ORYZA SATIVA L.).

This cereal, native to the marshy regions of hot countries, is one of the most important of this class as a foodstuff and industrial product. It is the principal food of all Eastern peoples. In the Philippines it is the principal crop upon which the sustenance of the indigenous population depends. All the other crops together would not be sufficient to cover the loss of this one, upon which the poor classes depend. A large number of varieties exist, as was seen in the collection presented by D. Regino Garcia at the Colonial Exposition, in Amsterdam, and which contain more than 120 varieties. The collection of 120 varieties presented by Señor Garcia at the Exposition of Paris in 1878, received the only gold medal presented by the judges to Philippine exhibitors. Two main divisions are made, according to the manner of cultivation. First, those varieties cultivated on the lowlands (irrigated lands), and second, those cultivated on uplands (dry lands), the latter being more numerous. Rice is supposed to be of Asiatic origin, and is the plant concerning whose cultivation the most ancient documents exist. Its introduction into the Philippine Archipelago was much anterior to the discovery of the islands. Morisqueta, or rice boiled in water without salt, is looked upon by the natives in the same way as we look upon bread.

The varieties of greatest importance are: Mimis, greatly esteemed on account of its white, transparent grain and exquisite flavor; Dumali, an early variety; Bontot-cabayo, and others which may be cultivated either on lowland or on highland.

The cultivation of rice is one of the few occupations which the native pursues with care, although they do not have at their command everything necessary to make the production most profitable. For the cultivation of lowland rice the ground is divided into little parcels, generally rectangular, and having a slight inclination, and which are surrounded with little dikes called pilapil, which serve to retain the water. The rice is sown by hand in little beds of moist earth. This seed rice is selected during the springtime. While these seed beds are sprouting the flooded lands are worked, the carabao (water buffalo), which serves admirably for this purpose, being used. In this way the soil is worked into a soft mud. When the rice has grown to a height of 20 centimeters it is pulled from the beds, formed into bundles, and taken to the place where it is to be transplanted. Regular lines of little holes are made in the softened earth, in each of which is placed a little bunch of six or seven stalks. The soil is not fertilized, nor is any other care given to the crop. When harvest time comes, which is usually in August, or from that time on, according to the variety of rice and the character of the soil, the plants are cut one by one, by means of a little sickle, or the yatap. This latter instrument consists of a little blade of steel or of tin, semicircular in form, fixed into a little handle.

This palay is now placed in heaps called mandalas. The grain is now separated from the straw by thrashing, in which operation water buffalo play an important part. At other times this thrashing is accomplished by pounding the

[a] We do not include sugar cane in this group, considering it a commercial product which will be included in the last group.

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straw in a large wooden mortar, called a lusong, or simply by striking the bundles against a stone. When there is sufficient wind the grain is separated from the straw and the dust by its use. It is finally separated from the husk by pounding it two or three times in the wooden mortar, or by making use of a sort of handmill, called guilingan.

On the highlands it is necessary to go over the ground two or three times and break up all clods. The seed is sown by hand after the first heavy rains, and without other care the crop is finally collected. The natives of the interior, and even some of those of the Christian towns, are accustomed to plant rice on virgin soil, in the preparation of which they are compelled to cut down all trees. Some of these are burned and others are used to make fences about the field.

The rice plant has many enemies, the most important of which is the locust, which, when it appears, totally destroys the crops. Another insect attacks the young and tender grain, sucking out the juice and leaving it completely empty. Another enemy is the maya (*Munia oryzivora*, L.), a small bird abundant in the lowlands. Sometimes monkeys injure the crop in certain regions.

The production of rice has diminished in the Philippines on account of the increased production which has taken place in adjacent countries. The Chinese market, to which formerly a large amount of Philippine rice was exported, supplies itself at present with greater economy and in greater abundance with the rice from Cochin China. This latter place even supplies the Philippines with rice whenever the crops are short. Again, lands which formerly produced rice for export are now given over to the cultivation of sugar cane, with great advantage to the general wealth of the country.

CORN (ZEA MAYS L.)

Corn is a cereal which sometimes gives abundant crops. It is a monoicous plant of great importance on account of its grain, its flour making excellent food. It is used likewise as food for cattle, as are the leaves and young stalks, which make excellent fodder. And, finally, an alcoholic drink, which the Bisayans call pangasi, is made from it. It is of American origin, from whence it was carried by the Spaniards. At first the natives received it with indifference until, on account of frequent losses of the rice crops, they became accustomed to its use. Its cultivation has become quite generalized throughout the archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice, as in Cagayan and Isabela. In many towns it has taken the place of morisqueta, being reduced to a coarse granular flour by means of the guilingan, and then boiled in water without salt.

ZACATE (GRASS).

Under this name are included several species of grasses which make up the forage of the live stock, especially horses. The chief ones of these belong to the genus Leersia. The fields where this grass is raised are the objects of much care on the part of the native farmer, especially if they are in the vicinity of large centers of population, as the returns are excellent. The grass is cut several times a year.

COGON (SACCHARUM KOENIGII RETZ).

This grass reaches the height of 2 meters, forming a sort of forest almost impossible to traverse without first making a path, either by means of fire or with a knife. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season. They are thus able to obtain the young shoots, which when not more than 18 inches in length are much relished by cattle. In regions where the nipa does not grow, cogon is used for thatching the houses.

SORGHUM OR BATAD (HOLCUS SACCHARATUS BL.).

Although this plant has given excellent results in the United States and other places when cultivated for sugar or the production of alcohol, in the Philippines it is used only for fodder. This is true of a number of other plants belonging to the genera Paspalum, Milium, Panicum, Sporolobus, Chloris, Avena, Poa, Bromus, Agrostis, etc., which grow on the pastures of the mountains.

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BAMBOO.

Under this name are included various species of cane of the genus Bambusa, which are of great importance in the Philippines. The principal species are *Bambusa diffusa* Bl., *B. monogyna* Bl., or *Cauayang quilang* B., *pungeas* Bl., or Cauayang totoo, *Bambusa mitis* Bl., or Taivanæ, *Bambusa lima* Bl., or Anos, and *Bambusa textoria* Bl., or Calbang. All of these bamboos are used for many things, but the most useful of all is the Cauayang totoo, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed principally in the construction of native houses, which are often made wholly of bamboo, except for the rattan used to tie it together and the cogon used as thatch. The posts, floor, rafters, and doors are all made of bamboo, and the native is very skillful in working it. Either entire or split into strips, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding, vessels of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan, are truly providential for these countries.

CHAPTER II.

VEGETABLES.

In this chapter are included those plants of the family Leguminosæ which serve as food, those whose tubers are edible, those roots which are edible, and, finally, the plants cultivated in the gardens.

DIVISION A.—LEGUMES.

MONGO, FRIJOL, AND OTHERS.

Leguminous plants are of but little importance in this country. One of the most commonly cultivated is the mongo (*Phaseolus mungo* Bl.), smaller than the lentil, but of the same flavor, and which is cultivated on a large scale, as it is the principal food of many towns. The butingui (*Phaseolus vulgaris* L.) is the true kidney bean, which is found in considerable variety in the garden. The zabache (*Phaseolus lunatus* L.) is also greatly prized. The sitao (*Phaseolus caracalla* L.) produces a vegetable about a foot long. The frijol from Abra (*Phaseolus tunkinensis* Lour.), and the patani (*Phaseolus inamomus* L.) are both highly prized by the natives. There are also some species of the genera Dolichos, Vigna, Pachyrhizus, and Prophocarpus, which produce vegetables or edible seeds less highly esteemed than those of the genus Phaseolus.

DIVISION B.—TUBERS.

SWEET POTATOES (IPOMŒA BATATAS LAMK.).

Although the origin of this plant has been much discussed, it is believed to have come from America. Its tuber, which is commonly called camote, is very suitable for food, and its cultivation is greatly favored by mountain races, which would seem to favor the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are likewise edible. When the ground is given over to the exclusive cultivation of this plant it is allowed to take root in all directions, and, as the roots extend and grow the tubers continually, they may be dug up for use at any time of the year. When its cultivation alternates with that of rice or corn it is necessary to plant anew each year, the product usually being of greater value than in the previous years.

THE POTATO (SOLANUM TUBEROSUM L.).

The plant originally came from the Andes, and was introduced into Spain after the conquest of Peru. After that its use extended over the rest of Europe, especially after the tests by Parmentier, who during the last century demonstrated that the potato was not poisonous, as was believed, but that, on the other hand, it was very useful as a food. These tubers have about 20 per cent of solid matter, and more than 80 per cent when desiccated at a temperature

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of 120 degrees. In Europe they form the basis of the food supply of the lower classes, and are of industrial value, especially in the manufacture of alcohol.

In the Philippine Archipelago this valuable tuber has not done well, and is only cultivated with success in certain elevated localities, such as the district of Benguet.

DIVISION C.—ROOTS.

GABE (COLOCASIA ESCULENTA SCHOTT).

This plant, introduced a long while ago from Asia, is to-day extensively cultivated in almost all the islands, especially in the mountain regions. Its large roots and young leaves make an excellent food for the natives. The badiang, which is cultivated principally in the Visayas, has the same uses. There are three principal varieties, the best known of which is the variegata.

UBE, TUQUI, ETC.

Various species of the same genus Dioscorea are found either growing spontaneously or being cultivated for their edible roots. Among these are the ube (*Dioscorea alata*), the tuqui (*D. sativa* L.), the paquit (*D. divaricata* L.), the nami-conot (*D. pentaphylla* L.), the tongo (*D. papillaris* L.), and others. They all have large roots and sometimes attain enormous sizes. They may be eaten boiled or without other preparation than leaving them in water for some days. The tuqui and the ube, being most highly prized, are most extensively cultivated. The rhizome of this latter makes a healthy food of a sweet taste. It is somewhat sour when raw, but is rendered sweet and nutritious by boiling, Its cultivation is simple, somewhat similar to that of the potato. It is necessary to carefully prepare these tubers for eating, for when this is not done they are poisonous.

DIVISION D.—GARDEN PLANTS.

PRINCIPAL SPECIES CULTIVATED IN THE PHILIPPINES.

Although the natives do not care much for the cultivation of these plants, gardens are found near the large centers of population, generally cultivated by Chinese, the products being used by Europeans. Among those cultivated are the following: Onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Anethum fœniculum*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family Cucurbitaceæ there are also a large number of plants which are generally eaten boiled. Among these are the common squash, of which there are several varieties, the condol (*Cucurbita aspera*), which is oval in shape and very suitable for making sweets. A variety of squash known to the natives as calabasang bilog (*Cucurbita sulcata*), which is of a green color, much prized and extensively cultivated, and the tabayag (*Lagenarie vulgaris*), the meat of which is soft and smooth to the touch. The genus *Cucumis* is represented by no less than four species in the Philippines. The tabacog (*Cucumis melo*), which is the true melon, and which, although possessing a delightful aroma, never reaches the excellent flavor of those of Europe. The pepino, or cucumber, which is eaten boiled or pickled. The patola (*Cucumis acutangulus*), large in size, and eaten green or boiled. The milondaga (*Cucumis luzonicus*), small in size and with a flavor similar to the cucumber, and the watermelon, sandia, or pacuan.

Albay is the only locality where the strawberry occurs.

CHAPTER III.

FIBER-PRODUCING PLANTS.

IMPORTANCE.

The so-called textile plants are those which furnish fiber for the manufacture of cloth, cordage, etc. They are called industrial because of the large number of hands employed in the manufacture of these products in the great manufacturing centers. The principal ones found in the Philippines are hemp, cotton, the pineapple plant, ramie, agave, cabo-negro, rattan, pandan, and palma buri.

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MANILA HEMP (MUSA TEXTILIS L.)

This plant is greatly appreciated for the excellent quality of its fiber, which constitutes one of the chief articles of exportation. Its principal cultivation is in the provinces of Ambos Camarines, Albay, Sorsogon, and Catanduanes, in the islands of Samar and Leyte, and on a smaller scale in Cebu, Mindoro, Marinduque, and the north of Mindanao. In Negros it grows well only in the southern part, and in Panay the small quantity gathered is of inferior quality. The fiber is obtained from the outer of the sheathing leafstalks, which in these plants forms the apparent trunk, as in bananas. This sheath is cut into lengths and then into strips, which are called sajas. There are many varieties of hemp, in some places as many as fourteen. The differences between these consist in variations in color in the bulb and lower part of the trunk, in the greater or smaller number of shoots, and in the development and strength of the fiber. In Albay experts distinguish varieties according to the size of the stalk, the shape and size of the leaves, and especially according to the strength of the fiber in the sajas. Even though experts recognize these characteristics in each variety, it is very difficult to do it at first sight, as the different names given to the different varieties in the different localities cause some confusion in the determination of them.

Cultivation.—This plant needs a moist climate, the lack of which is sometimes supplied by planting trees, which furnish shade and prevent the loss of water, which, by evaporation, is continually going on from the broad leaves. These trees also aid by drawing moisture to the surface by means of their long roots. Trees having high branches, narrow leaves, and deep roots are those most serviceable for this purpose. The lands should be open and moist, but not swampy. Sloping lands having a clay soil, situated on the hillsides or mountain sides, are suited to the cultivation of this plant. The best fertilizer is the refuse of the plant itself left after the extraction of the fiber, as this contains the same elements which have been taken from the soil. Other articles, such as ashes, or any substance which contains potash and soda, may be used. New plants are grown from shoots or suckers, called by the natives saja, which grow about the base of the plant. The plants may be grown likewise and with considerable economy from tubers and from seed, but these methods are rarely used. For new plantations recently cleared mountain lands are used, a few trees being left for shade, the trunks and branches of the others being burned. After the ground has cooled the shoots are planted in little holes 1½ or 2 meters apart. As the little shoots are very slow in growing, some other plant is usually sown on the same field to check the growth of weeds which might destroy the hemp plant. For this purpose the sweet potato is most serviceable. At the end of three years the plant has reached its full development, the most suitable time for cutting being when the fruit begins to show, as the fiber is then in the best condition. The trunk is cut down with a sharp machete or knife. The lower part of the trunk and the leaves are then cut off and the external layers of the plant or those containing the fiber are then removed and carried to the workhouse where the fiber is extracted.

Enemies of the hemp plant.—Two insects, the larvæ of which are called by the natives tamiloc and amarog, pass through the metamorphosis in the trunk of this plant. The former of these measures about 4 centimeters in length, the latter 1½ centimeters. A large hole may be observed somewhere about the lower part of the plant attacked, which soon assumes a yellow color and dries up before reaching half its full size.

Production and prices.—There has been a constant increase in the area of land devoted to the cultivation of hemp. It is estimated that the annual production of the archipelago is more than 1,000,000 piculs. Hemp is classified in commerce in three grades—current, second, and colored. The price of the first grade between the years 1885 and 1894 varied between $17.12, its highest price, and $6, the lowest price, per kilogram. The other two classes sell at prices from 25 to 40 per cent lower than the first. All of these prices are those of the market of Manila, being somewhat less in the provinces.

The cultivation of hemp began to assume important proportions in the Philippines in 1855, at which time it was second in importance among articles of export from these islands. It is exported principally to the United States and to England, small quantities going to Spain, Australia, Singapore, and China.

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COTTON (GOSSYPIUM HERBACEUM L.).

This plant is cultivated in the Philippines and the provinces of North and South Ilocos, Union, Pangasinan, and Abra. The species cultivated are *Gossypium herbaceum* and *G. perenne* and *Ceiba pentandra*. The first two are known to the natives as capas and bobuy, and the latter as capasanglay. They are respectively herbs, bushes, and trees. The capas or herb is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, the cotton being used only for making pillows and mattresses.

Cultivation and preparation.—The soil should be open, strong, and easy to work, and should be deeply plowed and carefully prepared. It should be planted, when there is no danger of heavy rains, in furrows a meter apart, the plants being an equal distance apart in these furrows. When the fruit is ripe it is collected and the cotton is passed through a series of manipulations, rendering it suitable for the manufacture of cloth. The first operation is the separation of the cotton from the husk, after which the fiber is separated from the seed, to which it strongly adheres. This operation is accomplished by the means of a little hand machine, called laddit, which is composed of two parallel wooden cylinders revolving in opposite directions. The cotton is passed between the cylinders and separated from the seed. With this primitive apparatus one man working ten hours can obtain 3 or 4 kilograms of clean cotton. The cotton is then spread on drying tables, after which it is ready for spinning. The enemies of the cotton plant which menace production are the curiat, or field cricket; a gray caterpillar which is the larva of a butterfly (*Noctua subterranea*); and the larva of *Melolontha vulgaris*, called by the natives abaleng.

PINEAPPLE (BROMELIA ANANAS L., OR ANANASA SATIVA LINDLEY).

A plant of the family Bromeliaceæ, which is cultivated for its delicious fruit and for the fiber which is obtained from its leaves. This latter is similar to that obtained from the agave. Its origin is tropical America, from whence it was spread to Africa, Oceania, and even to Europe. The pineapple has about the same geographical distribution as coffee, but is grown on some mountains at an altitude not suitable for coffee. It requires an even temperature which does not fall below 18° C. It will grow on almost any kind of ground, but gives best results in open, strong soil. It grows from the seed, which is sown in parallel lines 1¼ meters apart, the individual plants being one-fourth meter from each other. In Cuba it is cultivated almost exclusively for its fruit, which has an exquisite flavor, and is sweet, aromatic, and slightly tart, on account of the presence of malic acid, which makes it somewhat indigestible. In the Philippines it is of more importance as a textile plant.

Method of obtaining the fiber.—The fruit of the plant is first cut so that the leaves may become as long and broad as possible. When these leaves are well developed they are torn off and then scraped with a fragment of glass or some other sharp instrument so as to separate the fleshy part and leave the fibers behind. It is then washed, dried in the sun, and combed out. It is classified in four grades, according to its fineness, and is then employed in the manufacture of fabrics in the same way as Manila hemp. The finer filaments are woven in very rough looms into a most delicate cloth. This commands a high price, and is used for making handkerchiefs, waists, and other garments. This cloth is very highly prized in the Philippines, as much as 20,000 reals having been paid for a single embroidered suit.

RAMIE (BOEHMERIA NIVEA).

This plant, of the family Urticaceæ, probably has its origin in Java, Sumatra, or the southern part of China. It is a nettle, like those of Spain, but without needles. It is cultivated for its fiber, which is formed on the outer part or bark of the plant. It grows to a variable height, according to climate and soil, of between 1 and 2½ meters. Beyond doubt the famous Canton linen is manufactured from this excellent fiber, which rivals flax. In spite of the excellent quality of this fiber the cultivation of this plant has not increased, on account of the difficulty of extraction, which can only be profitably done with special machinery. In the Philippines it is found only in the Batanes Islands and the north of Luzon.

The plant *Urtica arborescens* Bl. or Dalonot, whose fiber is employed for the same purposes, also exists.

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AGAVE (AGAVE AMERICANA L.).

This plant, belonging to the family Amaryllidaceæ, comes originally from America. Its fleshy, sharp leaves, bordered with a row of spines, furnish a fiber from which delicate cloth nipis is made. It is cultivated on a small scale in certain localities in the Philippines. The Tagalogs call it magui, or magüey. It is exported in bulk to England, China, Japan, and Egypt.

CABO-NEGRO (ARENGA SACCHARIFERA LABILL.; CARYOPA ONUSTA BL.).

This plant, called cauong by the natives, belongs to the family of palms. Along the edge of the stem of the leaf are long, black, and very strong fibers. which are useful for the manufacture of ropes and cordage. These are very durable and resist moisture and even salt water. It is used also in making walls or partitions, and has some other uses which will be mentioned later.

RATTAN (BEJUCO).

Of the genus *Calamus* there are several species called by the natives dilan, yantoc, talola curag, and palasan. These spiny, climbing plants, which sometimes attain a length of 200 meters, furnish to the natives a useful material of most extended application. All the framework of the houses built of bamboo and nipa, and many of those built of wood, are held together only by strongly laced bands of rattan, this article supplying the place of nails. These rattans are also employed in the rigging of all the smaller boats, and in the making of rafts, etc. In some of the provinces hats and sacks or bags are made from rattan and in other places chairs and other articles of furniture.

PANDAN (PANDANUS SPIRALIS BL.).

This plant belongs to the family *Pandanaceæ*. Its leaves are used for the manufacture of hats and sacks, an industry developed in Lucban and the province of Tayabas. The huge, wide leaves of the palm called buri (*Corypha umbraculifera* L.) are also used for this purpose. In the same way the split stems of the leaves of the nito (*Lygodium semihastatus* Del.) are utilized.

CHAPTER IV.

PLANTS FROM WHICH OIL IS OBTAINED.

COCOANUT (COCOS NUCIFERA L.).

This is one of the most important plants of the archipelago, satisfying, as it does with its various products, so many industrial, economic, and medicinal wants. It will be discussed here simply as an oil-producing plant.

It belongs to the family of palms and comes from India. Many varieties are found in the Philippines, especially in the Visayan Islands. The chief ones of these are called cayumanus, limbaon, dahlili, and macapuno, the chief points of difference being in the fruit.

Cultivation.—This plant will grow almost anywhere and does not demand any particular kind of soil. Nevertheless, if a plantation is to be established, it is best to choose land situated near the sea, having a reddish soil mixed with sand, as the salt water and the regular winds seem to benefit the trees. It is not expedient to place plantations on highly elevated ground, as the winds easily uproot many trees. Young trees grow from the perfectly ripe fruit. In Cuba, where the cultivation of the fruit is carried on with much care, beds for sprouting the seed are made in suitable soil, and the young trees are carefully guarded. In the Philippines the nuts are placed without any preparation close together in beveled beds, where they are exposed to the influence of the air. In following this procedure it is a year before the plant reaches a height of a meter. Another and shorter method is to hang the nuts on trees in such a way that they are partially protected from the sun, but exposed to atmospheric influences. In this way the plants will attain the height of a meter within five months. The small trees are now transplanted into previously prepared soil. The holes in which they are placed should be not less than 1½ meters in diameter in loose soil and 2 to 3 meters in mountain soil. The plants should be from 8 to 12 meters apart, according to the character of the soil, and the transplanting

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should be done just before the beginning of the rainy season. After planting they require but little care. Weeds must be kept out, insects destroyed, the dry leaves cut away, and in certain cases, when the dry season is very prolonged, irrigation must be resorted to during the first few years. It is a good idea to cultivate some other crop, such as corn or the mungo, for the first few years. On good land the plantations begin to bear fruit at the end of seven years; on poor lands no fruit is borne for ten or twelve years.

Diseases.—The diseases of the cocoanut tree are brought about by atmospheric conditions or by animal or vegetable parasites. Among the first may be mentioned excessive humidity, especially when the water lies about in pools, and an unusually prolonged dry season, very strong winds, and earthquakes. Earthquakes produce such an effect upon the vegetative functions of the tree that ordinarily many of the nuts drop off within a short time. Among animals may be mentioned crows, rats, and bats, which cause but little damage. Locusts at times devastate the plantations, eating not only the leaves but the leaf ribs. Hogs sometimes destroy the young trees. The beetles *Rhyncophora ochreatus*, *Eydana*, and *Rhyncophora pascha* Bohem., called by the natives Bagañgan, penetrate the terminal bud of the tree and destroy it in a few days. These insects are destroyed by pouring into the holes they make ashes, sand, or an infusion of tobacco. Among parasitic plants may be mentioned a fungus (*Uredo cocivora*). This microscopic plant collects on the terminal bud of the tree and destroys the outer covering of this organ, the fungus appropriating the nutritive elements to its own use. This operation destroys the tree in a short time, as the fungus multiplies from its spores with great rapidity. The best treatment consists in destroying the affected or suspected trees with fire.

The analysis of the meat of the cocoanut, according to Buchwer, is as follows: Water, 31.8 per cent; stearin and olein, 47 per cent; albumin, sulphate of calcium, and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent.

The nuts are collected every four months. They are taken to market in such vehicles as are used in the country or, if possible, by water, when a raft is formed of the cocoanuts themselves, having simply a rope about them to prevent them from separating. The owner rides on top of this raft of cocoanuts.

Uses.—When the fruit is to be used for the manufacture of oil a disk of the outer husk, called by the natives bonot, is first cut from either end. The rest of the husk is then removed by means of a conical-pointed iron which is fixed in a piece of wood. The inner covering, or shell, is then divided into two parts. The adherent meat is then separated from the shells by means of a semicircular knife fixed in a wooden support, or perhaps by a spherical iron grater, which is fastened to the end of a wooden shaft lying horizontally and which is turned by means of pedals. When extracted in this manner the meat of the nut is deposited in a large wooden tub which has a hole in the bottom for the escape of the oil, which flows from the mass simply by exposure to the sun; but this process is very long, as to extract all of the oil requires a month or more. It is likewise very imperfect, as the decomposition of extraneous material imparts to the oil a dark color and an almost insupportable odor. A better and more general method of extracting is by means of fire. The cocoanut meat is placed in suitable receptacles or in specially prepared ovens and boiled, or it is placed in large kettles having a slow fire underneath. During the boiling a froth containing extraneous material is thrown away. It is usual to express the oil from the meat, as a much larger quantity is obtained. If the nuts are good ones and the operation is done with care, 5 liters of oil should be obtained from 30. The natives use this oil as a condiment, and while still fresh as a purgative. It is greatly used for lighting purposes and in the manufacture of soaps. Both in the Philippines and Europe it is used in the manufacture of perfumery.

BENNE SEED (SESAMA, OR AJONJOLI) (SESAMUM ORIENTALE L.).

This plant, belonging to the family Pedaliaceæ, has been known in the Orient from the most remote time and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil. This oil, somewhat similar to olive oil, and often mixed with it to adulterate it, has a sweet taste, although more insipid than olive oil, and is very slow in becoming rancid. In Egypt, Japan, and other oriental countries it is used in cooking in place of lard or olive oil. As it is an excellent article for making soap, it is an

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important article of trade between Europe and Egypt and oriental countries. It is also used as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer and also as an excellent food for fattening cattle. Of that cultivated in the archipelago but a small quantity is exported. For perfect ripening this plant requires a temperature 30° C. and an even climate. It should be planted in places protected from strong winds, preferably on alluvial or clay soil of average fertility and capable of irrigation. The seed is sown by hand, after which the crop requires no care except thinning a little when the plants are from 12 to 16 centimers in height. The crop is harvested when the stalks begin to fall and turn yellow. Great care must be taken in harvesting or the seed will be lost.

LUMBANG (ALEURITES TRILOBA BL.).

This plant, of the family Euphorbiaceæ, is cultivated for the oil which is extracted from its seeds. This oil is of good quality, is used for lighting purposes and for calking ships, and is excellent for painting. The refuse left after the extraction of the oil is generally employed as a fertilizer for the betel palms. Lumbang oil is exported to China.

CASTOR OIL (RICINO) (RICINUS COMMUNIS L.).

This plant, a native of India, belongs to the family Euphorbiaceæ, known also as the Higuera infernal (infernal fig) and to the Tagalogs as tañgantañgan. It is cultivated for its seeds, which produce about 40 per cent of a purgative oil much used in medicine and which may be also used for lighting purposes.

A reddish oil very useful for illumination is extracted from the seeds of a tree (*Jatropha curcas*) belonging to this same family and which is known to the Tagalogs as tuba, in Iloilo as casla, and in Ilocos as tavatava.

THE PEANUT (MANI, OR CACAHUATE) (ARACHIS HYPOGÆA L.).

This plant, belonging to the family Leguminosæ, is a native of lower Guinea, from whence it was carried to Brazil, and is now cultivated in all America, the southern part of Europe, Asia, and Oceania. In the Philippine Archipelago it is cultivated on a small scale only as forage for cattle.

The most important use of mani is the extraction of a fixed oil from its seeds. This oil has the important property of not becoming rancid for a long time. If the climate is suitable and the cultivation carefully carried on, the seeds will yield half of their weight in oil, but as ordinarily cultivated they do not yield more than one-third. It is a pity that in the Philippines, which has a climate so well suited to this plant, its cultivation is not more carefully and extensively carried on. The oil is fluid, yellowish in color, without odor, and with a decided sweetish taste, which makes it inferior to olive oil. It may be employed in the preparation of toilet oils, soap, and lubricating oils. The residue obtained after the extraction of the oil, mixed with an equal weight of flour, is employed for making bread. It may be mixed with cacao for the manufacture of chocolate.

CHAPTER V.

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DIVISION B.—PLANTS PRODUCING STARCH.

The so-called feculas, or starches, are carbohydrates which exist in plants, constituting one of the most abundant of their proximate principles. They are found in the seeds of cereals, in vegetables, in tubers, in the trunks of various palms, in the roots of some plants of the family Euphorbiaceæ, and in various organs of many other plants. According to their origin they take different names—that from wheat and other cereals is called starch; that from the potato and other tubers, fecula, which is a generic term and is usually considered synonymous with starch; that from the yucca or cassava, tapioca; and that from the palm, sago. Here will be discussed only those plants from which some one of these proximate principles is extracted. They all furnish food of great nutritive value and easy of digestion.

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CASSAVA, YUCCA, OR CAMOTING, CAHOY (*Jatropha manihot* L.)

This plant is an herb of the family Euphorbiaceæ, a native of tropical countries. It is notable for its roots, which contain an abundance of starchy fecula known by the name of tapioca, whose good qualities are so well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions; the soil should be strong but not low, sandy and loose, so that the development of the root is not restricted; to accomplish this the ground must be plowed four or five times, finally leaving the straight parallel furrows one or two meters apart in order to allow the unrestricted growth of the plant. The plant is multiplied by means of buds growing from knots on the woody trunk, pieces of which are planted horizontally in the furrows and covered with nine or ten centimeters of earth. The roots of the camoting cahoy attain considerable size, and while they are still fresh they contain a milky juice which is poisonous, but this deleterious substance disappears upon boiling or simply upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

According to Chemists Bontron and Henry, this poisonous principle is prussic acid in very small quantities, and in such a diffused state that it can not produce an instantaneous effect, but it does when concentrated. In order to utilize the root of the camoting cahoy as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice; the material remaining behind after these operations is the flour or tapioca. This material after being taken from the press is roasted on some hot surface, being continually stirred. The fecula or tapioca is very nutritious, some maintaining that half a kilogram a day is sufficient for one man. It is white or yellowish white in color, sweetish in taste, and somewhat insipid. It is much valued in medicine on account of its digestibility, and it is much used as an infant food.

ARROW ROOT.

This is also called maranta, and in the Philippines tagbac-tagbac. It belongs to the family Marantaceæ, of which two species are known: *Maranta indica* L., and *M. arundinacea*, the latter a name of America and the former of India. Both are important on account of their roots, which produce the starchy feculas known as arrow root and sago. The latter is a herbaceous plant, a meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant, even in the method of growing. The part of the stalk under ground gradually diminishes in size, to the point of insertion, into a long horizontal, fleshy-white tuber, which seems to be a rhizoma, and which contains a considerable quantity of fecula.

Cultivation.—It is cultivated with success in all loose, fairly damp soils. It is planted from buds which are placed separately in holes about 60 centimeters apart, as the plant is very leafy. The crop can be collected in six or seven months without further care.

BURI (*Corypha umbraculifera* L.).

This plant is celebrated in all the Philippine Archipelago, giving name to the island of Burias, where it is found in abundance. It is found in all the other islands, although in some not in the same abundance as others. It belongs to the palm family, grows to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves. These are green in color, the young ones, however, being very white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large and are different from those of the cocoanut tree; they extend from a single base in the form of a fan. This plant is of the greatest value to the natives. It does not produce fruit till after many years, and when it does once produce it, it dries up and dies. The fruit grows in bunches from the top of the tree, and is filled with little round nuts like hazelnuts. The fruit, however, is not edible.

Use and method of preparation.—To obtain the starch, the tree is cut down at the root, and all of the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the naturally bitter substances are drained from it; it is now pounded with sticks or mallets, when the starch separates in the form of very fine grains; it is then collected and dried and

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made into flour, which serves as food for the natives, and some of which is sold in Manila and other parts. It furnishes an excellent, tasteful, and good food, which is called in commerce sago. In Burias, Masbate, Bohol, and other parts where the tree grows in abundance, it takes the place of rice as a food stuff.

BAGSANG (METROXYLON RUMPHII MART.).

This palm, called Bagsang, is very common in the Visayan Islands and very useful to the inhabitants. They neither plant it nor cultivate it, as it grows spontaneously from the seeds which it produces or from the shoots which grow at its base. It generally grows along the banks of rivers and estuaries, in moist regions, and in places near springs. This plant has many uses in all times, but especially if there is a lack of rice or other food stuffs. To obtain it, the tree is cut down and stripped of its bark, which is called baje, and which is utilized by the natives in many ways. The interior or heart of the tree is then cut into strips, which are dried over a fire and saved for further use. It is then pounded in wooden mortars, being reduced to a sort of flour, which is of great nutritive value. It is most frequently made into cakes or fritters, which, when eaten with cocoanut milk, are very good and healthful.

LUMBIA, OR LUMBAY (METROYLON SILVESTRE MART.).

This is a palm very similar to the preceding one, but taller and larger and having wider and stronger leaves. It grows along the shore of the sea and along the banks of rivers and creeks and in other places where water is abundant. It grows from its small fruit, which is not edible. A species of flour is obtained from the heart of this palm, which serves as a food stuff to the poorer classes, especially during times of famine.

CAUONG (CARYOTA ONUSTA BL.).

This is a palm similar to the preceding, from whose trunk a species of sago is obtained. The method of extraction is that generally pursued. The tree is cut down and the fibrous material removed from the interior. This is pounded and then soaked in a cask, when a fine white flour settles to the bottom. The water is poured off, the precipitate remaining behind being a sort of sago.

PAGAHAN, OR BANGA (CARYOTA URENS L.).

This palm, although containing a poisonous substance, furnishes a starch, or kind of sago, of excellent qualities and in good quantities. It is prepared according to the methods already described.

CHAPTER VI.

PLANTS PRODUCING SACCHARINE AND ALCOHOLIC SUBSTANCES.

Two groups of plants are included in this chapter, the saccharine plants, or those which produce sugar and alcohol, and those from which alcoholic drinks are made. Only the species of both groups cultivated in the Philippines will be mentioned.

SACCHARINE PLANTS.

SUGAR CANE (SACCHARUM OFFICINARIUM L.)

This plan, known by the name of sugar cane or honey cane, belongs to the family of grasses. It is a native of India and China. In the Philippines it is one of the agricultural products of greatest importance. The sugar-producing provinces are Pampanga and the island of Negros, and on a smaller scale the Laguna, Bataan, Batangas, Iloilo, Cebu, Cavite, Pangasinan, Capiz, Antique, and Mindanao. There are many varieties of sugar cane, there being no less than twenty in the Philippines. The most important one cultivated, besides the ordinary variety, being the Batavian, which is distinguished from the common variety by the violet color of its stalks and the larger number of joints and its greater size; the Otaheite, which is taller and larger than the previous one,

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and has a lemon-yellow stalk; finally the yellow or creole variety, which has a slender stalk, and is yellowish white in color.

Cultivation.—This plant for its full development requires a climate whose temperature is not less than 18° C., and which should be as high as 23° C. during the ripening period. The soil should be deep and of medium consistency and, preferably, clayey loam or silicious. The best fertilizers are manure, ashes, blood from the slaughterhouses, lime, and green stuff; fish, on account of the phosphorus which they contain; sulphates and phosphates of potassium, and better than all of these, the bagasse, or the refuse left after grinding the cane. The ground should be prepared by plowing three or four times, and finally by hoeing, leaving it perfectly soft and smooth. Little holes of varying depths are then made in the soil at a distance of a meter or a meter and a half from each other. In these are placed little pieces of the stalk, some 40 centimeters long, each one of which should contain eyes or buds. These should be placed in water twenty-four hours before planting. They are then placed four or five in a hole, somewhat inclined, and are covered with 4 or 5 centimeters of soil, and worked if necessary. Other care of the crop is reduced to irrigation, hilling, and necessary weeding. The cutting begins when the cane assumes a yellow color on the lower part of the stalk and when the juice shows 8° or 9° on the Baumé scale. The cane should be cut obliquely and when the earth is not too moist, as when there is an excess of moisture the blow of the machete or knife breaks the root and thus injures the plant. In the Philippines the cultivation of sugar cane is generally carried on with little care and intelligence, and this is one of the reasons why the quantity and quality of the crop has diminished. To increase the production, it will be necessary to perfect methods of cultivation, selecting the best varieties of cane, or those which are best suited for the existing conditions, and tilling and fertilizing the land with more care; so, too, much greater care should be taken in the manufacture of the sugar.

SORGHUM (SORGHUM SACCHARATUM PERS., OR SACCHARUM KOENIGII RETZ).

This plant likewise belongs to the family of grasses, and in its stalks are sweet juices which sometimes give as high as 17 per cent of prismatic sugar. In the Philippines this plant is utilized only for forage, although it might well be cultivated for the production of sugar in certain regions where sugar cane does not grow well. Sorghum demands the same kind of soil and the same cultivation as corn. It is planted in the same manner and should be weeded and hilled in the same way as corn. Alcohol for industrial purposes can be obtained from sorghum as well as from sugar cane.

ALCOHOLIC PLANTS.

Under this heading will be included such vegetables as contain glucose or other substances which can by means of fermentation be converted into alcohol or alcoholic drinks. In the Philippines these plants are nipa, cocoanut, buri, cauong, pugahan, maize, and others.

NIPA, OR SASA (NIPA LITTORALIS BL., NIPA FRUCTIFICAN THUNB.).

The nipa is a palm which grows to a height of 4 meters, and from whose short stem rise large leaves composed of a multitude of little ensiform leaflets. The fruit consists of various clusters lying very closely together, although they are easily separated, which together form a large bunch hanging at the end of a thick peduncle which arises from the base of the tree. It is indigenous to the coast and grows only in muddy regions, or those which are liable to be overflowed, or the mouths of rivers which communicate with the sea. It is one of the most useful trees found in the Philippines. As a thatch it covers a great majority of the houses and even some of the churches in the islands. Many of the native houses have the walls and partitions made of nipa, as well as the roofs; but of still greater importance than the leaf is the tuba or sap from which nipa wine or arac (arrack) is made and which is consumed to such a great extent by the natives.

Cultivation.—Nipa groves must be prepared by planting, which usually takes place between May and the last of July. The ripe fruits which fall to the ground are collected and employed for this purpose. Two or three of these fruits are placed in holes which are located about 1.7 meters from each other.

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As the rains are very frequent during these months and the ground is kept moist it is not usually necessary to irrigate. This condition of moisture of the ground is also favored by the high tides. In order to get the best results from the grove all dead leaves, or those which could prejudice the development of the fruit, should be removed.

Method of obtaining the tuba.—A grove becomes serviceable at the end of five or six years. In order to obtain the tuba an incision is made in the peduncle immediately below the point of insertion of the fruit, leaving a few of the best developed fruits for purposes of reproduction. A liquid which flows from the incision is collected in bamboo tubes or joints called bombones, which are hung conveniently on the plant. In order that this sap shall flow with the greatest facility several little operations are gone through with. The first of these, called sicat, consists in striking the peduncle of the fruit several blows, with the object of loosening somewhat the tissues and opening the pores. This operation should be done once a week during the five months preceding the producing season. Simultaneously the process called talog, which consists in cleaning the peduncle of all leaves, is gone through with. When the collecting season arrives the operation called pucao is gone through with. This consists in rapidly rubbing the foot against the peduncle so as to call the sap toward the fruit. After this comes patit, which consists in cutting the peduncle near the base and leaving the bamboo joint attached, in which the juice is collected as it falls drop by drop. After this the incision on the peduncle is renewed twice each day, morning and evening, the tuba being collected daily. The collecting season lasts about ten months, the production increasing gradually for the first five months and decreasing slowly from that time. The average production of a single plant is about 46 liters during the season. When the business is carried on on a large scale one half of the product goes to the owner and the other half to the workmen. The tuba is afterwards distilled and then concentrated in stills, and although the loss of liquid is great, there still remains a considerable amount. This tuba, when much fermented, may be used as vinegar. One hundred jars of this vinegar, each containing 48 liters, sells for $10 or $12.

THE COCOANUT (COCOS NUCIFERA, L.).

Method of gathering the tuba.—To obtain the tuba from the cocoanut tree the same is cut before the flower is formed and before it has appeared externally. A bamboo joint or bombone is then attached for the collection of the liquid. The flower cluster or summit is bound together with pieces of rattan so that the bamboo joint can be easily adjusted. As one tree may have several flower clusters, as many bamboo joints as are necessary are placed in position. A little of the powdered bark of the tongog (*Rizophora longissima*, Bl.) is placed in each bamboo joint; this serves to give strength and a reddish color to the wine. The wine is collected daily by men who carry large bamboo joints hanging over the back and held in place by a curved piece of wood. Attached to this large bombone, which is carried on the shoulder of the workman, is a rounded receptacle made of a shell of a cocoanut, which contains the powder already spoken of. Every time one of the small bamboo joints is emptied it is necessary to clean it perfectly on the inside and to renew the powder. This cleaning is done by a little brush or broom, which is made of a piece of the stem of the leaf of the cocoanut tree, which is carefully pounded on the end so as to convert it into a shorter brush. A small quantity of powder is then placed in the bombone and a fresh incision made in the flower stem. This cutting of the flower stem is done with a very sharp little curved knife. Each stem will produce wine for a period of two months, after which it dries out. In order to facilitate climbing the trees notches are made on either side, thus forming a sort of ladder. When a collection of tuba is carried on on a large scale, in order to avoid the loss of time involved in climbing each tree, large bamboos are tied from one tree to another horizontally, the two passing from tree to tree; one of these serves as a footbridge and the other as a hand rail. Men frequently fall from them, often with fatal results. This tuba begins to ferment within an hour, more or less, after its collection, and at the end of a day it has changed to a sort of vinegar, fermentation often being facilitated by the addition of suitable plants. The liquid is then distilled, the distillate being known as cocoanut wine.

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BURI (CORYPHA UMBRACULIFERA L.).

This plant also produces a wine called tuba. It is obtained from an incision in the fruit, from which the juice issues. From this juice wine is made, and also a yellow honey-like substance called pacascas.

CAUONG (CARYOTA ONUSTA, BL.) AND PUGAHAN (CARYOTA URENS L.).

A sweet liquid or tuba is obtained in the same manner in the fruit of these plants.

There are also other plants of less importance from which the natives obtain their favorite drink, tuba.

MAIZE OR INDIAN CORN, ETC. (ZEA MAYS L.).

An alcoholic drink, called in the Visayan Islands pangasi, is obtained by the fermentation of the starch of corn. Several families generally unite to make this drink, and they generally end up by becoming very joyful and noisy.

CHAPTER VII.

AROMATIC PLANTS.

TOBACCO (NICOTIANA TABACUM L.).

Tobacco is a plant belonging to the family Solanaceæ, having straight cylindrical stems, wide soft leaves of a dark-green color, whitish-green funnel-shaped flowers, and numerous seeds contained in the two sides of a pod or capsule. It is an annual plant in Europe and evergreen in South American and other parts.

This plant is a native of America. It was introduced into the Philippines by missionaries in the last quarter of the sixteenth century by means of seeds coming from Mexico. Its cultivation spread rapidly on account of the favorable conditions of climate and soil, and the favor with which the natives looked upon it. From the Philippines it was introduced into the south of China.

Species and varieties.—The genus includes a large number of species and varieties widely distributed over all parts of the world. In its properties and uses it differs but little. The principal species and varieties are:

First, common tobacco (*Nicotiana tabacum* L.), called also tabaco macho, or male tobacco, which is the best of all. It is somewhat gelatinous or viscid. Its stalks reach a height of 1 meter, its leaves are oval or heart shaped, and its flowers purple.

Second, tobacco hembra (female), or Mexican tobacco (*Nicotiana rustica* L.), which has rounded leaves, and which is cultivated with good results in the south of France.

Third, verina, or Brazilian tobacco (*Nicotiana paniculata* L.). This is a small species, very mild, demanding a very warm climate. It is much used in Turkey.

The principal varieties of the first species are the Virginia tobacco, which has sharp leaves and does not require an especially fertile soil, and which loses but little in drying; Carolina tobacco, with shorter and narrower leaves than the Virginia tobacco and likewise less delicate in its growth. Tobacco growers, paying little attention to the botanical and scientific classification and more to the form and utility of the plant, divide it into two classes, wide leafed and narrow leafed. The qualities determining the price of tobacco in the market are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Philippine tobacco, which up to a short time ago was considered second best in the world, on account of its agreeable aroma, fine veins, and notable elasticity, has recently lost much of its reputation. Tobacco coming from the province of Isabela de Cagayan is considered the best in the Philippines. That from the Visayan Islands is coarser, more unequal in color, and of greater strength. The tobacco from Nueva Ecija is fine, but somewhat bitter in taste and yellow in color. That from Union, Ilocos, and the Igorots is of heavy body, broken, and frequently has but little combustibility.

Philippine tobacco may be divided into two groups: First, the varieties with elliptical or ovate, wide, or heart-shaped leaves, which is called in the provinces

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"tobacco from the old seed;" and, second, tobacco with lanceolate, narrower leaves than the preceding, which is generally known under the name of "tobacco from new seed." The former comes from Mexico, and the latter is supposed to have been introduced recently from the United States.

Cultivation.—Although tobacco grows in almost all climates, the product is more abundant and much better when grown in hot climates, as the heat has a great influence in determining that important quality, the aroma, which it is impossible to impart artificially. The lands most suitable for its cultivation are those of medium consistency and depth, which are cooled during the summer time, or such as have a sandy or silicious subsoil covered with loam, which are situated along the banks of rivers which are periodically overflowed, thus adding new mineral and organic constituents to the soil. These lands are called vegas (meadows), and in this country the name of vegueros is given to the workmen on such plantation. As the tobacco plant is very delicate, it is necessary to fertilize the soil thoroughly. Among fertilizers may be mentioned those which contain potassium, lime, chloride, and phosphate, the best being manure in an advanced stage of decomposition. The preparation of the soil, which should be very deep and carefully done, consists of three plowings at intervals of several days, and the completion of the process by grading and leveling and the removal of all injurious weeds.

The tobacco seed is sown in hotbeds, which are made on level, clean ground, having a carefully fertilized soil. The seed is selected from accredited sources and sown broadcast, being mixed with fine sand. These beds are about a yard wide, space enough being left between them to allow of the passage of weeders and other workmen. The seeds are covered lightly with earth, which is packed down a little and then irrigated, this operation being frequently repeated until the plants appear. These beds should be fenced in and covered over with branches, so as to protect the plants from the direct rays of the sun, but not interfere with ventilation. When the plants have four leaves this cover is removed, so that they may develop with greater vigor, and transplanting immediately begins. The plants are separated a distance of about 60 centimeters from each other. When the flowers begin to appear and 10 or 12 leaves have developed, the buds are cut from the extremities of the stalks, so that the sap may flow to the leaves and nourish them with greater vigor.

The gathering of the leaf is begun when the plant is in just the right condition and the recognition of this is of the greatest importance for the quality of the tobacco. At this time the leaves begin to turn yellowish, wrinkle somewhat, droop, and show more or less of a sticky juice, according to the abundance or scarcity of rain during this period of ripening. This condition having been reached, the process of gathering begins. This may be done either by cutting off the stalk at the base, which is not a good way, or by collecting the leaves, one at a time, in the order in which they grow; or, beginning below, gathering a handful of two or three at a time. They are then classified according to size and quality, being left on the ground until they have dried. The tobacco is then tied in bundles, which are suspended by cords in the tobacco storehouse. They are thus protected from the sun, but are exposed to excellent ventilation on all sides by windows and doors, which are opened or closed, according to circumstances.

Diseases.—The tobacco plant is subject to injury from various kinds of insects which attack it. Among these the most dreaded is that called cogollero. This is a white butterfly, which is so called because it grows and develops in vegetables, such as cabbage and lettuce. The gordo is a large black worm which eats the stems of the leaves, cutting them and causing them to fall. The cachasado is the larva of *Hadena androgea* Lat., which lives and hides during the day in the roots of the plant. The primavera is very voracious, and the babosa and other small animals not so much dreaded.

Chemical composition.—The chemical composition of tobacco is very complex and variable, according to the kind and origin of the sample under examination. Vauquelin and other chemists who have analyzed it have found inorganic substances, such as silica, potassium, magnesia, ammonia, nitric acid, hydrochloric, phosphoric, and sulphuric acids; neutral organic substances, such as cellulose, oil, yellow and green resins, and a volatile alkaloid called nicotine. This is an oily, colorless substance of pungent taste and odor, soluble in water, alcohol, and ether. This alkaloid is found from 1½ to 9 per cent, according to the kind of the tobacco, and it is worthy of note that the best tobaccos, and those having the greatest reputation, are those which contain the smallest quantity of nicotine. Doctor Lebon, of Paris, has recently announced the presence of a new

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alkaloid in tobacco—collidine—which is as poisonous as nicotine. Nicotine is very energetic and in a short time poisons small animals, but is much less active in the plant itself, as it is mixed with other less active and inert substances.

COFFEE (COFFEA ARABICA L.).

Coffee is a plant of great importance in the Philippines. It belongs to the family Rubiaceæ, is a bush 2 or 3 meters high, having permanent leaves and white, fragrant flowers like jessamine in appearance, which have five stamens grouped together near the base of the leaves. The fruit is an oval fleshy berry, somewhat resembling a cherry, having a clear, green color, which changes to intense red when the fruit ripens.

History.—This valuable fruit is a native of ancient Ethiopia, obtaining its name from the region called Kaffa, where it grows in great abundance. It was brought to the Philippine Archipelago by the Spanish missionaries toward the end of the last century, where it was first cultivated in the province of Laguna. It was afterwards naturally propagated easily and rapidly by a little mammal (*Paradoxurus musanga* L.), which fed upon the berries. Afterwards its cultivation fell to the lowest ebb in spite of premiums offered to cultivators. At the present time, due to the increased price of coffee and better facilities for exporting, its production has begun to increase.

Species and varieties cultivated.—Although there are many different species of the genus *Coffea*, but four constitute the coffee of commerce. They are: *Coffea arabica*, or common coffee; *Coffea racemosa*, or Peruvian coffee, very similar to the preceding; *Coffea laurina*, or African coffee, and *Coffea liberica*, or Liberian coffee, a more robust plant, which has larger leaves than the common coffee plant. Almost all of the varieties cultivated come from the first species, which is the one requiring most heat. In the Philippines the provinces producing most coffee are Batangas, Laguna, Tayabas, and Cavite in Luzon, and the districts of Cotabato and Misamis in Mindanao.

Cultivation.—Coffee requires a climate whose average temperature ranges between 16° and 24° C., and, therefore, next to sugar cane, is the plant requiring the greatest amount of heat. In localities having both heat and moisture its growth is stronger and more luxuriant, as is manifested in various ways. In very hot climates the coffee plant grows well, but should have the shade of some other suitable tree, whereas in cooler climates it thrives best without this protection. The soil most suitable for its cultivation is that which is light and moist, but not marshy. Reddish soils somewhat sandy, or black soils without too much clay, are suitable for its cultivation.

If the land is virgin soil it should be thoroughly cleared, plowed deeply two or three times, and then harrowed, and if old land, it should be well fertilized.

Planting can be carried on in various ways; the best are by means of hotbeds and by transplanting. These hotbeds or nurseries are made in well-shaded soil, which should be clean, well worked, and thoroughly fertilized. The seed should be ripe and fresh and not taken from the fleshy covering. Transplanting is done when the plants have three or four roots, care being taken not to injure the delicate stem, although a part of the central root is cut off at the moment of transplanting. Plants which have reached a height of 40 or 50 centimeters may be used by cutting off the upper part of the stem and likewise the vertical root, stamping down the earth about them and immediately watering. The ground where this transplanting is made should be previously prepared, holes being made in parallel lines running north and south, and having a distance of 2½ meters from each other. The land should afterwards be kept clean and other trees should be planted for their shade. The tree usually employed in the Philippines for this purpose is called madre cacao (*Galedupa pungam* Bl.), but there are many who advocate the use of the balibago (*Hibiscus tiliaceus* L.) as giving better protection to the plantations and being more productive. Experience demonstrates that the pruning of coffee trees prejudices the production, as the plant growing naturally with favorable rains produces at the end of six or seven years an average of 5 kilograms of berries for each one, while those which have been pruned do not produce one-fourth as much.

The gathering is accomplished either by shaking, if the plants are high, or by hand picking if they are low. After gathering the pericarpium is removed, an operation easily accomplished by hand, and the berries are placed in the sun, care being taken to separate those collected on various days. When the berries are thoroughly dried the husk is removed by means of a mill or other apparatus. The other operations necessary to prepare coffee for the market are winnowing,

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to separate the inner husk and all dirt from the berry, and sorting into first and second grades.

The coffee plant begins to produce in from three to five years, according to climate, soil, and cultivation; is in full bearing in six or seven years, and continues to be productive for thirty years if no accident happens. Philippine coffee compares well with that of Java or Martinique, but there are certain localities which produce coffee which, according to experts, can be compared only to that of Mocha.

From former times the production of coffee in the Philippines has fallen off greatly on account of the destruction of the plants by an insect of the genus *Xylotrechus* and by a fungus of the genus *Peronospora*.

CHOCOLATE (THEOBROMA CACAO L.)

Cacao or chocolate belongs to the family Sterculiaceæ, and is a native of Mexico and South America. It is a tree which is distinguished for its beautiful appearance, but more for its fruit, which is very highly prized, as is shown in its botanical name *Theobroma* (food for the gods). The seed of this fruit properly roasted gives out a delightful aroma, and well ground and mixed with sugar and a little cinnamon it forms chocolate, a nutritive, healthful, and agreeable food. It was introduced in the Philippine Archipelago from America some time between the years 1660 and 1670. Although it has been cultivated for a long time in small quantities in various provinces of Luzon and Visayas, it flourishes best in southern Mindanao, and in the district of Davao it is produced in large quantities and of excellent quality.

The tree reaches a height of from 8 to 11 meters and has straight branches. The petiolate leaves, oblong or ovate-oblong, are acuminate, strong, and smooth, and of same color on both sides. The small flowers are reddish in color and very numerous. The fruit is reddish or yellowish, ovate or oblong, having ten ridges, and simulates to a certain degree the shape of a small cucumber. The seeds are somewhat larger than an almond.

Cultivation.—This plant demands a warm climate having an average temperature of from 23° to 29° C. and a considerable amount of moisture in the atmosphere. The soil should be deep and light. Black and reddish soils, somewhat sandy, with an abundant top soil of muck, are excellent.

Planting can be done from the seed, and to save time this is usually done by planting the seed a distance of from 2½ to 3 meters from each other in parallel lines. In the Philippines the seed is often planted in bamboo joints or in the forest, from whence they are transplanted to ground shaded by banana plants. As the chocolate plant requires shade, the tree called madre cacao is usually planted. This plant requires much more care than the coffee plant. In its cultivation it is necessary to remove all premature flowers, trim off dry branches, and keep the ground well cleaned.

The fruit is gathered when it becomes ripe. The life of the chocolate tree is supposed to be about thirty years, during which time it produces fruit. It may live to be 50 years old or more, but is almost unproductive.

NUTMEG (MYRISTICA FRAGRANS HOUTT.).

The nutmeg grows naturally in Cebu and in Laguna Province, and will grow in all parts of the islands cultivated. It is a tree belonging to the family Myristicaceæ. In the Dutch possessions the tree reaches a height of from 10 to 13 meters. The trunk is covered with rather thin bark, blackish and slightly mottled, from which, when incised, flows a reddish juice which coagulates on contact with the air. The fruit is about the size of a small peach, having a thick husk and a hard pit about the size of an almond, inside of which the nutmeg is formed. This is surrounded by an aromatic rind, or skin, called mace. The beautiful flower of this tree is aromatic, and from it a kind of preserve, noted for its fragrant odor, is made.

The tree begins to produce at the age of 5 or 6 years, but the crop is very light at first.

CINNAMON (CINNAMOMUM BURMANNI BLUME; LAURUS CINNAMOMUM BLANCO).

The cinnamon tree is found in these islands, especially in Mindanao. In Zamboanga, Caraga, and in the mountains of the district of Misamis varieties of cinnamon of stronger taste and fragrance than those of Ceylon are found.

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The reason it is not more exploited is because it seems to contain some kind of bitter principle, which is noticed when it is chewed. This tree should be more highly prized in these islands, as it grows wherever it is planted. The cinnamon comes from the bark of the branches which have been stripped of their epidermis, and is an aromatic substance, having many uses.

PEPPER (PIPER NIGRUM, L.).

This plant belongs to the family Piperaceæ. Its cultivation diminishes daily in the Philippine Islands. It is a climbing plant, which is fastened to adjacent trees when cultivated. Its fruit is a berry which, when dried, is black or white pepper. In the northern part of the islands the long pepper of British India can be cultivated.

BETEL OR ITMO (PIPER BETEL, L.); BUYO DE ANIS (PIPER ANISORUM, BL.)

The betel or itmo is a climbing plant, belonging to the same family as the preceding. It is cultivated very extensively throughout India, the Sunda Archipelago, all the regions adjacent to Asia, and the Philippines. In all of these countries the leaves are used in making the preparation which is known in the Philippines as "buyo." This preparation is composed of one of the leaves of this plant, a piece of lime the size of a pea, and a piece of bonga or betelnut. The object of this mixture is to mollify and render supportable the taste of the pepper leaf, which otherwise would be acrid and disagreeable.

The buyo de anis has a leaf which has an agreeable odor resembling anise. This leaf is used by some natives to mix with the pepper leaf in the preparation of buyo.

CHAPTER VIII.

MEDICINAL PLANTS.

PLANTS USED FOR DISEASES OF THE HEAD.

The castor-oil plant (*Ricinus communis* L.), of the family Euphorbiaceæ, which is called "tangan-tangan," is very abundant in these islands. It is used principally to alleviate headaches, being applied on leaves to the forehead, causing sweating and, consequently, relief. Mixed with the oil of sesame it is applied to the stomach with good effect; so, too, it is applied to the feet of persons suffering with dropsy.

Balocanad (*Aleurites trisperma* Bl.) belongs to the family Euphorbiaceæ. It has a fruit a little larger than the pomegranate. This fruit contains six or seven poisonous seeds. The oil of these seeds when rubbed into the scalp kills all vermin.

The leaves of the capanatolet or gaudarura, when properly applied, improve and cure those who suffer with pains in the back.

The so-called dacdac has medicinal properties. Its stalk or stem is about the size of the index finger, somewhat flattened, and blackish in color. An infusion is made from this stalk chopped up finely. When the head is bathed with this infusion, headaches disappear, as does the lethargy from which the patient suffers. This is true when it is used in the treatment of any other cephalic disease.

PLANTS USED FOR THE DIGESTIVE APPARATUS.

The salibutbut or pandacaqui (*Tabernæ montana*) belongs to the family Apocynaceæ. An infusion of the root of this tree when given as a drink improves the stomach and bowels in cases of distention, cold, and indigestion. It is likewise an excellent blood medicine, and is used with great benefit by women after parturition.

The leaves of the taguypasin or alom are of value in any chronic stomach disease due to inflammation, overloading, or cold. They should be applied hot or united with oil used as an unguent. They are of great value in reducing inflammation or swelling of the limbs if used in the same way. They cause sweating, after which the limbs should be enveloped in a blanket, dried, and the operation repeated if complete relief is desired.

The leaves of the maisipaisi (*Clausena* sp. Bun.), of the family Rutaceæ, have an odor and flavor very similar to that of anise. From these leaves an

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oil of anise is made, which is very useful for diseases of the stomach. Made as an infusion with cocoanut wine, it furnishes a drink much used in the country.

The tree known by the name of "bacao" furnishes a bark which, when pulverized and mixed with water, furnishes a remedy which kills all kinds of intestinal parasites. This same property is possessed by the fruit of a trailing plant called "tangulon," "piñoncillo," or "niogniogan" (*Quisqualis indica* L.) of the family Combretaceæ.

The tree called "bahay" (*Adenanthera pavonina* L.) produces a fruit something like ordinary beans in appearance, but of a bright red color. These placed in cavities of teeth greatly relieve the pain, the same object being accomplished by the root.

The grated bark of the maragaat (*Ficus radiata* Dec.), of the family Urticaceæ, when applied to the gums reduces swelling and strengthens the teeth.

The paetan (*Lunasia parvifolia* Muell.), of the family Rutaceæ, is an antidote for fish poison. Taken as a powder, it cures any stomach disorder and is an excellent remedy for ulcerating sores, which it cleans and closes.

The sambong (*Blumea balsamifera* DC.), of the family Composita, is an excellent sage, quite aromatic, and having medicinal properties. As an infusion it is much used in diseases of the stomach.

The tangulon (*Quisqualis indicus* L.), of the family Combretaceæ, is another species of trailing plant, which grows bountifully along the seashore, produces a seed called "piñoncillo," which is an excellent vermifuge. It may be eaten raw without danger of injury.

The cabcaban (*Polypodium quercinum*, L.) and the balsamina or apalia (*Momordica balsamina* L.) produce purgative medicines.

PLANTS USED FOR THE CIRCULATORY APPARATUS.

The sibucao or Brazil wood (*Cæsalpinia sappan* L.), of the family Leguminosæ, is medicinal. An infusion of it causes the absorption of coagulated blood, and it is given in cases where blows on the body have caused the extravasation of blood into the tissues.

The cumalibquib or himangcoran or otob-otob are medicinal. The grated root made into an infusion cleans and cures ulcers or wounds. An ointment is made from this plant and from the jalanotan and hagonoy. This is made by boiling the plant in oil, straining, and adding a little wax. The ointment may then be used for the cure of wounds. So, too, the leaves of a climbing plant grown in the Visayan Islands, and which is called "balangon," is useful for this purpose. The pounded leaves are applied directly to the wound.

PLANTS USED FOR AFFECTIONS OF THE SENSES.

The tuyucay is used as a remedy for deafness. In the operation a branch 8 or 10 inches in length is placed over a slow fire until it becomes quite hot. It is then placed close to the affected ear and air is blown through the hole which passes through it, care being taken to keep the branch well within the ear. It is claimed that the hot tube has some special virtue, due perhaps to the medicated moisture thereof, and when penetrating the ear restores it to a healthy condition.

The tree called "haulig" is very useful for treating and preserving the eyes, a solution in water of the bark and leaves being used as a wash.

PLANTS USED FOR THE SKIN.

The resin of culasi (*Lumnitzera coccinea* Wight and Arn.), of the family Combretaceæ, cures scab and itch.

A resin which serves well as a caustic is obtained from the canumay and the lagnoto (*Diospyros multiflora* Bl.).

The tree called panjantolon (*Scaevola koenigii* Vahl.), of the family Goodenoviaceæ, an extraordinary large tree, is useful in medicine. An infusion is made from the leaves and bark which is used as a lotion for those suffering with specific trouble. This cures the disease and relieves the pain in the bones which accompanies this terrible disease.

The pila and the root of the trailing plant called mangadlao are both useful in treating all kinds of wounds.

All kinds of spots on the skin are cured by a lotion made from the roots of the tree called salac.

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A lotion made from the wood of the mampol, of the genus Loranthus of the family Lorantaceæ, will cause the pustules of smallpox to appear when they are slow in presenting themselves.

The leaves of the little tree called alocloc when crushed and applied to boils or other cutaneous tumors quickly brings them to a head and causes the removal of their contents.

Sarsaparilla of the genus Simlax, called by the natives banag, is very common along the banks of the rivers and the coast. The root is used in medicine and is well known as a remedy for those who suffer from specific ulcers. It is given as an infusion.

The trailing plant called bago-bago, of the genus Garcinia, family Guttiferæ, is also used. It is powdered and placed over the fire, and applied hot to patients suffering from inflammation, as it quiets the nerves and relieves the pain in the joints.

The plant called busalas is likewise medicinal. Its leaves, when reduced to ashes and mixed with a little oil, will bring to a head any kind of an abscess, or, if these are already in the stage of suppuration, it will cause them to open and will cure them without trouble.

PLANTS USED IN PARTURITION.

An infusion of the leaves of the taraje (*Casuarina equisetifolia* Forst.), of the family Casurinaceæ, will cure chlorosis.

The leaves of the alagtayo or ticala, when applied to abdomen of a pregnant woman, will very quickly bring on parturition.

PLANTS USED AS ANTIDOTES.

According to the opinion of experts the manungal (*Samadera indica* Gaert.), of the family Simarubaceæ, is one of the best antidotes found in these islands. A solution made by boiling is given to anyone who has eaten poisoned substances, such as herbs or fish. The oil of manungal is admirable for curing all kinds of disorders of the stomach, as is likewise the infusion made from marbar or cayutana.

An infusion of the bark of the palagnigon is both an antidote and a febrifuge.

An infusion of the bark of the calasusi (*Plumeria acutifolia* Poir.), of the family Apocynaceæ, is an excellent mild purgative, or may be used as an emetic.

The bark of the root of the tree called bagosabac is curative for the bite of any kind of poisonous animal or snake.

PLANTS USED AS FEBRIFUGES.

The tree called tambalaguisa or mantala (*Sophora tomentosa* L.), of the family Leguminosæ, has at a certain season a number of little yellow flowers, and following them, long pods filled with seeds, somewhat like chickpeas. This fruit is a febrifuge having a very bitter taste. One or two of the seeds are given to those who suffer from certain malarial fever. The medicine is still more valuable for those having quartan. It is likewise an excellent stomachic. From these seeds an oil is also made which gives great relief to pains in the bones. It is also used for intestinal troubles and is a remedy for chlorosis. Another trailing plant having admirable qualities is called by the Tagalogs macabuhay and by the Visayans pangianan (*Menispermum rimosum* L.) It belongs to the family Menispermaceæ. It is very bitter and very useful for the stomach and the entire body.

The bark of the tree called dita (*Alstonia scholaris* D. C.), of the family Apocynaceæ, when treated with acidulated water, produces an alkaloid, ditain, which is employed in place of quinine for all kinds of fevers.

PLANTS USED AS DIURETICS.

An infusion of the leaves of the tree called polotan or ulifigon serves as an excellent diuretic. The juice of the bark or an infusion of it is likewise useful.

The palo-santo, called by the natives guicos-guicos, or hannadao, of the genus Abrus, family Leguminosæ, possesses admirable properties. It is an excellent remedy for spasms and chills, from which so many suffer in these countries. An infusion of this plant expels injurious humors from the body, does away with obstructions, regulates the stomach, and is of equal value with sarsaparilla for specific trouble. It is likewise a sudorific.

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Naguini and languingi are trailing plants which cure muscular and nervous spasms, the leaves being applied as a plaster after being heated before the fire. The application is made under the arms.

PLANTS USED FOR VARIOUS MEDICINAL PURPOSES.

The pilipog is a most bitter medicine. It is useful as a stomachic, and simply chewed and swallowed serves to cure any kind of pain. It is likewise an antidote, and in the form of an infusion is a febrifuge useful in tertian and quartan fevers.

Among all the trailing plants found in these islands that which is of greatest importance and most esteemed is called by the natives igasud (*Strychnos ignatii* Berg.), of the family Loganiaceæ. The Spaniards, taking up the name which was given to it by the missionaries in the Visayan Islands, call it the pepita of San Ignacio. It abounds in all the mountain regions of Visayas, but is not found in Luzon. When full grown it is of considerable size, the fruit at times being as large as a pomegranate, though a little longer. It has a hard shell, within which is a yellowish or slightly reddish meat, and in this is found the seed so highly esteemed in all parts of the world. These seeds are grown principally near Catbalogan. They are used for persons who have eaten something poisonous, in which case a little piece is eaten and immediately followed by a drink of cold water, the poison thus being expelled. So, too, taking it in this manner it cures disturbances of the stomach or intestines. It is likewise useful for paralytics and for women during parturition. Grated or in the form of powder it is much used as styptic. Grated and given with water at the beginning of the chilly stage will often prevent an attack of malarial fever. It is also useful for the bite of the caterpillar called basut, when applied as a powder over the affected place. It is used also as an emetic. Held in the mouth and sucked, it is useful for rheumatism. So, too, it relieves indigestion. The oil remaining after pieces of this seed have been fried is useful for contractions of the nerves and pains in the body.

There are many other medicinal plants in the Philippines, as may be seen by consulting the General History by P. Juan J. Delgado, S. J., published in Manila in 1892, and others.

CHAPTER IX.

FRUIT TREES.

Philippine fruit trees in general do not produce such exquisite and highly prized fruits as do those of Europe. As both wild fruit trees and cultivated ones are very abundant, only the best-known ones will be spoken of; some mention will be made of their probable origin, arranging them according to the families to which they belong.

ANACARDIACEÆ.

Among the Philippine species of this family is the mango (*Mangifera indica* Linn.), which is believed to come from Macao, and which grows well in the provinces of Manila and Cavite, and also in the Visayas. The fruit season begins in April. The fruit has a delicate flavor and an aromatic odor, the largest of them being from 6 to 7 inches in length; in shape they are flattened, not round; the skin is yellow and rather fine; the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very narrow. The plant springs from this seed. The leaves are long and wide and dark green in color; an infusion of these is somewhat similar to tea. Besides this species the following are found: Manga de anis (*Mangifera fragans* Maingay) and mani (*M. cosia* Jack), which is found in Mindanao, of Asiatic origin; casuy (*Anacardium occidentale* L.), of American origin; siruelas (*Spondias purpurea* L.), from southern Asia; albudhod (*Spondias mangifera* Wild), found in Panay, also of Asiatic origin.

The mampon on pajomanga (*Mangifera altissima* Blanco).—This fruit is very similar to the mango, and when ripe is quite delicious. It is frequently preserved in brine in the form of pickles, and is very healthful; it is likewise made into sweetmeats and preserves. There are other small varieties of this kind about the size of an olive, which are used in making pickles and preserves.

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ANONACEÆ.

Among this family is found the anona (*Anona reticulata* L.). It is an exotic from Mexico, its flesh being white and containing small, black pits. It is sweet and fragrant.

ATES (ANONA SQUAMOSA L.).

The fruit is juicy and aromatic, very sweet, and so soft that it seems to melt in the mouth; it is somewhat peppery. Another species found is Guanabano (*Anona muricata*). All three species come from America.

EBENACEÆ.

But one species of this family is indigenous to the Philippine Archipelago, the mabalo (*Diospyros discolor* Wild), whose reddish fruit, about the size of a quince, contains a large seed; the flesh is white and sweet, but somewhat indigestible and has a rather strong odor. The sapote (*Diospyros ebenaster* Retz.) and the pagapat (*Diospyros kaki* L.) are natives of China.

GERANIACEÆ.

Of the American family there are two species, the balimbing (*Averrhora carambola* L.), which has the flavor of a quince, and the camias (*Averrhora bilimbi* L.), whose fruit when green has an agreeable, sour taste, but when ripe is sweet and fragrant.

GUTTIFERÆ.

Of this family the mangosteen (*Garcinia mangostana* L.) is found. It is an exotic, and grows only in Jolo and some points in the district of Zamboanga and Cotabato. It is called there the "king's fruit," because it is so highly prized by the Moro sultans. It is dark red or purple in color and about the size of an orange. The edible and juicy parts of the fruit form small white divisions, very soft, which are found in the interior; they are covered with a double skin, reddish in color, and which must be removed before the fruit is eaten. The fruit is sweet and very delicate in flavor. Its origin is the Indian Archipelago.

MELIACEÆ.

In this family is found the lanzon or boboa (*Lansium domesticum* Jack). The tree is beautiful in appearance and gives a cool shade; the leaves are a beautiful clear green; the skin of the fruit is a clear yellow, thin and fine; within it are contained five divisions, as in the lemon, but the flesh is crystalline white, almost transparent, sweetish sour, quite delicate, and very refreshing. Each fruit contains a pit, which is the seed from which the tree grows; it is more bitter than gall, but is not injurious, on the contrary it is something of a carminative. One may eat a hundred of these fruits without difficulty and without danger, for they are healthful and excellent for those who suffer from heat. Their origin is the Malay Archipelago.

Santol (*Sandoricum indicum* Cav.) is a large tree having leaves 6 or 7 inches long. The fruit is bitter-sweet in taste; it is used principally for preserves and pickles. Its origin is southern Asia.

MYRTACEÆ.

Macupa (*Eugenia malaccensis* L.) is a fruit about the size of a sweet pepper and of somewhat the same shape, rather larger and quite red in color; it is, however, more lustrous, being almost resplendent. It is bitter-sweet in taste, somewhat agreeable, but has no solid flesh which can be eaten.

Tampay (*Eugenia jambos* L.): This fruit is about the size of a small apple, the flesh being soft, sweet, and having an ordor like roses.

Duhat or limboy (*Eugenia jambolona* L.): This produces a wild fruit, dark purple to black in color, about the size of an olive. It is likewise a native of the Malay Archipelago.

Guayabo (*Psidium guayaba* L.): This exotic plant comes from Mexico, but grows so well here that entire forests of it may be found. There are three principal varieties. The fruit is yellowish in color and very aromatic, as are

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likewise the leaves. The interior of the fruit is filled with little, hard seeds or pits, which are embedded in the flesh. It is a carminative, and its astringent properties make it an excellent preserve. With simple sirup it is much used.

MUSACEÆ.

The banana is the most important of this family. In the Philippines there is a large number of species, varying greatly in their form and taste. The trunk of the banana tree is not solid, but soft and full of minute little tubes or aqueducts, which serve to conduct the sap which sustains and matures the plant within the short space of one year. Shortly after the fruit ripens the plant begins to decline and the leaves dry up and fall. The fruit grows in bunches of various shapes, according to the particular species. Important varieties are the saba (*Musa sapientum* L.), which is delicious and healthful when ripe; the hanipa, sweeter than the saba, and which is cultivated principally in Samar and Leyte; the tambonan, a very common and healthful species; the camada, very large; the binalatong, larger, more delicate, and more fragrant than the preceding; the tarip; the bungaran, rather indigestible; the putian; the torlangdato, called in Spanish "the lady finger;" the pitbitin, a small, sweet, and rich variety; the dariao, a good variety; the mungco, the talood, the tinumbaga, the dariyas, and others. P. Delgado enumerates and describes 57 varieties, as may be seen in his history.

CARICACEÆ.

Of this family there is but one Philippine species worthy of mention, the papaya (*Carica papaya* L.). There are two sexes, the male and female. The made does not produce fruit, only some tubes filled with small, white aromatic flowers; the female produces fruit. The tree is soft and yellow, looks somewhat like a palm, and has large, broad leaves; the fruit somewhat resembles a small squash in appearance. When it ripens, the skin changes from green to a reddish color, as does the flesh also. The fruit contains a number of seeds somewhat similar to squash seeds; it is sweet, refreshing, delicate, and pleasant to the taste. The tree is indigenous to America.

RUTACEÆ.

Of this family various oranges and lemons are found. Oranges of various indigenous species are found. The principal one is the cajel (*Citrus aurantium* var.). Another variety is the naranjitas (*Citrus aurantium*). There are several wild species, one of which is called "amumimtay" (*Citrus hystrix* DC.). They are very large, being 12 or 13 inches in circumference, having a thick skin, are very juicy and bitter.

There are more than seven varieties of lemons. The citron, which is very large, is also found in abundance.

SAPOTACEÆ.

The chico sapote (*Achras sapota* L.) and the chico mamey (*Lucuma mamosa* Gaert.) belong to this family. The fruit is about the size of an orange, green on the outside and black on the inside. It is sweet and agreeable and makes excellent preserves. It is a native of Mexico.

URTICACEÆ.

Belonging to this family is the nangca or langca (*Artocarpus integrifolia* Willd.). It has been claimed that the fruit of this tree is the largest found in the world, as some of them are as large as a good-sized water jar. The tree is large and thickly branched; the leaves are long and narrow. The fruit is produced alike from the branches and from the main trunk of the tree quite close to the ground, and even from the roots, this last being especially true when the ground is somewhat elevated. The ripening fruit is recognized by its aromatic and penetrating odor; the fruit is then cut. When opened along the middle it shows a large amount of yellowish or whitish meat, which is not edible, and a number of shells of a golden color each containing a seed. It resembles in sweetness the date, but it possesses an odor like musk. It is somewhat indigestible, but is quite nourishing. The seeds when boiled or baked

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somewhat resemble the chestnut. The wood of the tree is yellow, solid, durable, and very serviceable for working. It is a native of the Malay Archipelago. Other species are figs (*Ficus carica* L.), from western Asia; the rima (*Artocarpus incisa* L.), from the Malay Archipelago; the dalanguian camansi (*A. camansi* Bl.), an indigenous plant, and the marang (*A. polyphema* Pers.), of Mindanao.

VARIOUS WILD SPECIES.

There is a large number of wild species of fruits found in the Philippines. They are in general sour, sweet, and somewhat carminitive. Among these may be mentioned the doctoyan, the pananquian, the durion, the abuli, amahit, angiap, amaga, agononan, abubunanu, alnganisan, dæ amamampang, bonano, barobo or marobo, cabaan, carong, cagos, gayan, dalinson, etc., which are described by P. Delgado.

CHAPTER X.

VARIOUS VEGETABLE PRODUCTS.

ESSENCES OR ESSENTIAL OILS.

There are various trees in the Philippines from which these essences or essential oils may be extracted, but the only ones utilized are the ilang-ilang (*Cananga odorata* Hook); sampaguita (*Jasminum sambac* L.); champaca (*Michelia champaca*, L.).

Ilang-ilang (*Cananga odorata* Hook, *Unona odoratissima* Bl.).—This tree, belonging to the family Anonaceæ, produces ordinary looking flowers of a greenish color, but of great fragrance. The tree is utilized as a shade tree, and from its flowers, especially those of the mountain trees, a highly valued essence is extracted by distillation. This essence, called "ilang-ilang," has been popularized by the Parisian perfumers. This essence is exported in small quantities to France, England, Singapore, and China.

Sampaguita (*Jasminum sambac* L.).—Sampaguita is a plant belonging to the family Oleaceæ. From the white fragrant flowers a highly-prized essence is extracted by distillation by perfumers.

Champaca (*Michelia champaca* L.).—The champaca belongs to the family Magnoliaceæ, and is a tree about 4 meters in height, conical in shape. The flowers are very fragrant, and about an inch in length. It is much cultivated in gardens, but is not found in the mountains. By distillation a well-known essence is extracted from the flowers.

RESINS.

In the Philippines there is a large number of trees which produce resin. Some of these are used in medicine, some for illuminating purposes, others in the manufacture of varnishes, others in painting, and others for calking ships. The principal ones will be indicated by families:

Araliaceæ.—The limolimo (*Heptapleurum caudatum* Vid.) furnishes a resin used in the making of varnishes.

Burseraceæ (*Abilo*) (*Garuga floribunda* Decne.) produces a resin used in medicine. The antong or brea negra (*Canarium pimela* Kom) produces a resin used for illumination. The pili or brea blanca (*Canarium album* Bl.) produces a resin which is used for illuminating purposes and for calking ships. The papsaingin (*Canarium cumingii* Engl.) produces a resin used for the same purposes.

Coniferæ.—The galagala or piayo (*Agathis orantifolia* Salisb.) produces a resin which is used for burning, for lighting, and for the manufacture of varnishes.

Dipterocarpaceæ.—The apitong (*Dipterocarpus grandiflorus* Bl.) produces a resin used for illumination. Balao or malapaho (*Dipterocarpus velutinus* Bl.) produces a resin used for calking. The mayapas (*Dipterocarpus turbinatus* Gaert.) produces a resin similar to the preceding one, which is used for the same purposes. The duagling (*Dipterocarpus* sp.) produces a resin useful for illuminating purposes. The guijo (*Shorea guiso* Blume) produces a resin used for the same purposes as the preceding; as does the yacal (*Hopea plagata* Vid.). The resin from the lauaan (*Anisopetera thurifera* Bl.) is used for burning, for the manufacture of varnishes, and for calking. The resin from the malaano-

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nang (*Dipterocarpus* sp.) is used for calking. A resin used in medicine is obtained from the mayapis (*Dipterocarpus turbinatus* Gaert.), and one useful for lighting purposes is obtained from the paua (*Dipterocarpus vermicifluus* Bl.).

Euphorbiaceæ.—The resin from the alipata (*Excœcaria agallocha* L.) is used as a remedy for the bites of poisonous animals; taken internally it produces dysentery.

A medicinal resin is obtained from the birunga (*Macaranga tanarius* Muell-Arg.). The resin from the togocam (*Claoxylon wallichianum*, Muell-Arg.) is used for illuminating purposes and as a medicine.

Guttifera.—The binucao (*Garcinia* sp.) produces a resin used in medicine.

Leguminosæ.—The adyangao (*Albizzia procera* Benth) produces a resin used as an incense. A resin having medicinal properties is obtained from the caturay (*Sesbania grandiflora* Pens.). A resin useful for illuminating purposes is obtained from the cupang (*Parkia roxburghii* G. Don.). Another resin used for the same purpose is obtained from the cogontoco (*Albizzia saponaria* Blume).

Melastomaceæ.—A resin used for illuminating purposes and for calking ships is obtained from the bota-bota (*Melastoma obvolutum* Jack.).

Rutaceæ.—A resin used for illuminating purposes is obtained from the cajel (*Citrus aurantium* L.), orange tree.

Sapindaceæ.—The balinghasay (*Buchanania florida* Schau.) is used for illuminating purposes and for calking ships. An illuminating resin is obtained from the ligas (*Semecarpus perrottetii* March.).

Urticaceæ.—A resin from the breadfruit or antipolo (*Artocarpus mincisa* L.) is used as a medicine and as a bird lime for catching birds. The resin from the ambling (*Artocarpus ovata* Bl.) is used for making varnish. The resin from the camansi (*Artocarpus camansi* Bl.) is used as a medicine and as a drier. Nangca (*A. integrifolia* Linn. f.) produces a resin used for illuminating purposes.

GUMS (ALMACIGAS).

In the Philippines the name of almacigas is given to most of the yellowish and aromatic resins. The most valuable ones are found in the Calamianes, while others are found in Mindanao, especially in Davao and in Ilocos.

GUM RESINS.

The principal trees which produce gum resins useful in medicine, painting, or the arts are:

Anacardiaceæ, the casay or balubad (*Anarcadium occidentale* L.), which produces a gum resin used in the manufacture of varnish.

Apocyneæ, the dita (*Alstonia scholaris* R. Br.), which produces a medicinal gum resin, as do those of the species Laniti (Wrightia).

Euphorbiaceæ.—Medicinal resins are obtained from the bigabing (*Macaranga mappa* Mull. Arg.) and from the buta (*Excœcaria* sp.).

Guttiferæ.—The palomaria or bitao (*Calophyllum* sp.), the bitanhol (*Calophyllum wallichiana* Planch.), the gutagaby or tanglananac (*Garcinia morella* Derr.), and the gatasan-pula (*Garcinia venulosa* Choisy) produce gum resins used in medicine.

Leguminosæ.—Two gum resins used in medicine are derived from the aromo (*Acacia farnesiana* Willd.) and the narra encarnada (*Pterocarpus indicus* Willd.).

Myristicaceæ.—Medicinal resin is obtained from the dugoan (*Myristica* sp.).

Palmæ.—The bonga (*Areca catechu* L.) produces a resin used in medicine.

Rutacæceæ.—The lucban or naranjo (*Citrus decumana* Murr.) produces a gum resin likewise used in medicine.

Urticaceæ.—The balete (*Ficus indica* Bl.) and the banyan tree (*Ficus* sp.) produce gum resins used in medicine.

Sapotaceæ.—The notac (*Palaquium* sp.) produces a gum resin used as a glue and for other industrial purposes.

GUTTA-PERCHA.

Gutta-percha is found in considerable quantity in Mindanao, and is produced from the trunk and branches of several trees, from those of the genera *Ficus* and *Palaquium*. This tree is called by the Visayans solonot. In collecting this it is not best to follow the plan used by the natives of cutting down the tree;

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large trees only should be selected, and these should be tapped. Beneath this incision on the bark or the trunk a bombon or large tube of bamboo is placed to collect the supply. This product is then placed in a batea, or dish, where it is macerated with salt water, the dish being at the same time shaken. In this way the gutta-percha soon becomes solid; the water is then poured off and the gutta-percha is formed, while still plastic, into a plate or disk, but through the edge of which a hole is made, suspending it, and thus exposing it to the air, so that it may dry perfectly. This method produces gutta-percha of rather inferior quality.

A few years ago a considerable quantity of gutta-percha was exported to England, but on account of the many adulterations made by the Chinese merchants but little is now exported.

VEGETABLE WAX.

Many plants produce a certain amount of an oily material somewhat similar to beeswax. It is found sometimes as a deposit on the surface of leaves, fruit, or on the bark. This material is not of the same quality in all vegetables, although it has not been well studied. It is obtained from the palm (*Ceroxylon andicola*) and from the *Myrica cerifera*. It is found in the Philippines, in the Calamianes, in Paragua, and in some other parts. It is obtained from the trees by scraping the bark.

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[From census of the Philippine Islands, 1903, vol. 4, p. 11.]

I. PRODUCTS OF THE ARCHIPELAGO.

Importance and Extent.

The chief source of wealth of the Philippines since their acquisition and partial civilization by Spain in the sixteenth century has been the production and exportation of agricultural commodities.

The soil of the islands consists mainly of decomposed volcanic rocks, enriched with decayed organic matter. When sufficiently watered it is extremely fertile, yielding luxuriant tropical and subtropical growths, either indigenous or exotic. The range of products is very wide; about 300 fiber plants of either commercial or local value are found in the different provinces, while food-producing plants grow in great variety and profusion, as well as plants yielding valuable gums, dyes, oils, and medicines. Tropical fruits, such as the banana, mango, orange, and scores of others are produced with slight or no effort, while corn, small grains, potatoes, tomatoes, and many other vegetables respond readily to cultivation.

The principal vegetable products of the islands are hemp (abaca), sugar, tobacco, copra, and rice. Formerly coffee was an important product and figured largely in the insular export trade; but within the last twelve years the coffee plantations have been devastated by insects and disease, and the cultivation of the berry has been reduced to very small proportions. Corn of American origin is largely produced. The camote (a species of sweet potato) is an important food product throughout the archipelago.

Nuts of many kinds are produced, including the betel nut, extensively used by the natives in a manner similar to that in which chewing tobacco is used in the United States, and the cocoanut, the most important of all, the dry kernels of which constitute the copra of commerce.

Spices of various kinds, such as pepper, cinnamon, cloves, and nutmegs, are found in different portions of the islands. Experiments have demonstrated that the ordinary vegetables and cereals of the United States can be successfully cultivated in many sections.

The products of the soil used for manufactures, export, or home consumption have been classified as follows:

Fruits and nuts.—There are many varieties, the principal of which are the banana, mango, cocoanut, and betel nut.

Fiber or textile plants.—Nearly 300 varieties, the more important of which are abaca, rattan or bejuco, ramie, agave or maguey, pineapple known as piña, cotton, and pandan.

Oil-producing plants.—The most important is the cocoanut palm.

Grains and grasses.—The principal varieties are rice, corn, bamboo, zacate (grasses of several kinds used as food for cattle and horses), and cogon.

Dye plants.—There are many varieties, of which indigo is the most important.

Starch plants.—There are several kinds, the arrowroot being the principal one.

Saccharine plants.—Sugar cane is largely cultivated.

Plants used for the production of alcoholic liquors.—Tuba and vino are largely manufactured, principally from the nipa or sasa plant, and from liquid gathered from the cocoanut and buri palm.

Medicinal plants.—There are many kinds

Aromatic plants.—The chief among these are tobacco, cacao, and coffee.

Gum and resin bearing plants.—Among these are rubber and gutta-percha trees and vines.

Plants from which essences or essential oils are obtained.—The ilang-ilang is the most important.

Vegetables.—An extensive variety is produced, including many garden vegetables commonly grown in the United States. The camote (sweet potato) is the most largely grown.

Extensive areas are devoted to pasturage, and the carabao, or water buffalo, the principal and most useful animal in the Philippines, is bred in large numbers, as well as other horned cattle of Indian or Australian origin, horses, hogs, sheep, poultry, and other animals.

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The preponderating influence of agriculture is indicated by the following table, which shows, for the years specified therein, as far as can be gathered from existing available records, the combined values of the principal agricultural products exported from the islands, and the values of other exported products. The principal products to which the figures in the table relate consist of sugar, leaf and manufactured tobacco, raw and manufactured hemp (abaca), cocoanuts and cocoanut products (oil and copra), coffee, dyewoods, dry and liquid indigo. The per cents that these and other exports were of the value of all exports are also shown for each year covered by the table. The quantities and values of each of the above-mentioned commodities exported during the several years embraced by this table will be found in subsequent separate tables.

Detailed statistics for the period from January, 1896, to July, 1898, inclusive, are not obtainable; but the figures presented for each of the other years clearly demonstrate the prime importance of agricultural products and the comparative commercial unimportance to the islands of nonagricultural products.

Owing to lack of detail in classification in the Philippine customs records, it is impossible to indicate the years in which copra was or was not exported prior to 1890; and incomplete reports prevent the inclusion in the principal agricultural exports of certain products for some of the years covered by the table, as indicated by footnotes.

Values of principal agricultural and other exports from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Value of principal agricultural products exported.		Per cent of total value of exports.	Value of all other exports.		Per cent of total value of exports.	Total value of exports (dollars).
	Pesos.	Dollars.		Pesos.	Dollars.		
1854	5,031,451	5,329,313	79.21	1,320,897	1,399,094	20.79	6,728,407
1855	5,592,608	5,876,712	91.36	529,014	555,888	8.64	6,432,600
1856	8,150,144	8,564,171	89.24	983,173	1,033,119	10.76	9,597,290
1857	10,145,429	10,785,606	85.29	1,750,392	1,860,841	14.71	12,646,447
1858	6,572,394	6,906,272	69.79	2,844,581	2,989,085	30.21	9,895,357
1860	7,514,964	7,985,401	79.03	1,994,517	2,119,374	20.97	10,104,775
1861	6,444,102	6,763,085	79.90	1,621,428	1,701,689	20.10	8,464,774
1862	7,354,993	7,778,641	80.82	1,745,804	1,846,362	19.18	9,625,003
1863	8,534,380	9,019,183	84.86	1,522,438	1,608,912	15.14	10,628,045
1864	8,595,503	9,083,728	80.66	2,061,523	2,178,617	19.34	11,262,345
1865	16,148,423	16,978,452	77.14	4,784,194	5,030,102	22.86	22,008,554
1866	18,515,774	19,480,446	83.47	3,666,749	3,857,786	16.53	23,338,232
1867	19,677,272	20,533,233	89.41	2,329,532	2,430,867	10.59	22,964,100
1873	22,635,560	23,081,481	96.23	886,969	904,442	3.77	23,985,923
1874	15,755,217	15,830,842	91.05	1,547,760	1,555,189	8.95	17,386,031
1875	18,199,607	17,766,456	96.19	720,868	703,712	3.81	18,470,168
1876	14,095,515	12,893,168	95.00	742,281	678,964	5.00	13,572,132
1877	15,311,655	14,460,327	93.58	1,050,789	992,365	6.42	15,452,692
1878	15,887,569	14,400,492	90.94	1,582,736	1,434,592	9.06	15,835,084
1879	14,678,229	12,962,344	78.02	4,135,223	3,651,815	21.98	16,614,159
1880	21,641,217	19,472,767	92.29	1,809,068	1,627,799	7.71	21,100,566
1881	23,420,894	20,837,569	95.29	1,158,112	1,030,373	4.71	21,867,942
1882	19,956,146	17,806,869	96.53	717,187	639,946	3.47	18,446,815
1883	24,119,671	21,037,177	91.43	2,261,056	1,972,093	8.57	23,009,270
1884	17,480,632	15,086,813	76.09	5,192,201	4,740,579	23.21	19,827,392
1885	20,871,484	17,423,515	85.00	3,682,201	3,073,901	15.00	20,497,416
1886	18,672,314	14,594,281	72.60	7,048,718	5,509,278	27.40	20,103,559
1887	22,968,362	17,676,451	90.94	2,288,777	1,761,443	9.06	19,437,894
1888	25,333,942	18,706,583	96.35	959,329	708,368	3.65	19,414,951
1889	32,766,676	24,076,954	93.81	2,160,293	1,587,383	6.19	25,664,337
1890	23,104,051	18,996,151	88.14	3,109,503	2,556,633	11.86	21,552,784
1891	24,923,048	19,347,762	92.63	1,982,054	1,538,669	7.37	20,886,431
1892	27,205,559	18,630,367	97.24	771,010	527,987	2.76	19,158,354
1893	34,536,225	21,174,160	95.21	1,739,341	1,066,390	4.79	22,240,550
1894	31,580,173	15,752,190	95.26	1,569,811	783,022	4.74	16,535,212
1895	28,979,300	14,892,462	79.06	7,676,427	3,944,916	20.94	18,837,378
1898 [a]	----------	[b] 4,962,329	96.07	----------	203,027	3.93	5,165,356
1899	----------	[c] 14,186,438	95.55	----------	660,144	4.45	14,846,582
1900	----------	21,159,718	92.04	----------	1,830,655	7.96	22,990,373
1901	----------	22,854,974	93.27	----------	1,648,379	6.73	24,503,353
1902	----------	27,360,475	95.43	----------	1,311,429	4.57	28,671,904

[a] Five months—August to December, inclusive.

[b] Not including cocoanut oil, dyewoods, and indigo, the values of which are included with those for "all other exports."

[c] Not including cocoanut oil and dyewoods, the values of which are included with those for "all other exports."

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In addition to the principal products, the combined values of which are given in the above table, other products of the soil, such as vegetable oils other than cocoanut oil, nuts of various kinds other than cocoanuts, rice, fruits, plants, seeds, vegetable fibers other than hemp, and forest products of different kinds, were exported from year to year in quantities and of values too small to be of importance. The relative commercial importance of these products is evidenced by the fact that, with slight exceptions, the value of each was considerably less than 1 per cent of the total value of exports during each year for which statistics are obtainable.

It may be thought that sugar (a factory product) and other products that have undergone processes of manufacture, more or less extensive, should not properly be included in the above table as agricultural. While it is true that sugar is a manufactured article, it is so closely identified with and allied to agriculture, particularly in the Philippines, where the sugar is largely produced by primitive methods and is mostly of very low grade, that its classification as an agricultural product is thought to be justified. The same is true, though to a less extent, of manufactured tobacco.

In the absence of definite statistics regarding the production of tobacco, a large proportion of which is consumed in the islands, it would be impossible to indicate the relative importance of the crop without taking into consideration the value of both the leaf and the manufactured tobacco exported. It may also be said that in the Philippine Islands the difference in value between leaf and manufactured tobacco is not nearly so great as in other sections of the world, the element of labor, in which such difference principally consists, not being as important a factor there as elsewhere in computing values, because in the tobacco-manufacturing industry wages are much lower relatively than in America.

Manufactured hemp (principally cordage), cocoanut products (oil and copra), and dry and liquid indigo are also included as being primarily agricultural products and as having an important bearing on the industry in question, notwithstanding the fact that they have passed through manipulative processes.

[From census of P. I. 1903, v. 4, p. 117.]

Miscellaneous Products.

In addition to the soil products of which special descriptions have been given, certain food and other plants, some of which have been hereinbefore mentioned, are quite extensively grown for domestic use and in a few instances to a slight extent for export, the principal ones of which are briefly described as follows:

Maize, or Indian corn (*Zea mays* L.), brought to the islands from America by Spaniards, is cultivated quite generally throughout the archipelago, and in a few districts is the staple food instead of rice. As in the United States, it is used principally as a food for live stock, the leaves and stalk being utilized for this purpose as well as the grain. When planted in good land it gives two, sometimes three, crops per year, each crop yielding about two-hundredfold. In the Visayan Islands the grain is used to some extent in the making of an alcoholic beverage called *pangasi*.

Zacate, which includes grasses of various kinds suitable for forage for live stock, especially horses, is carefully grown, particularly near Manila and other centers of population, and yields good returns to the farmers, who gather several crops per year from each field. The species grown about Manila is *Leersia hexandra*. The grass is not cured but is packed in small bundles as soon as cut and sold to consumers for immediate use in its green state.

Teosinte (*Euchlaena luxurians*), recently introduced into the islands, is a highly valuable annual grass, with very numerous stems from 6 to 12 feet tall, of which as many as sixty or seventy sometimes grow from a single seed. The stalk, leaves, and spindle resemble Indian corn.

The following description of this valuable forage grass, its cultivation, and the results of experiments in its culture, is furnished by Prof. F. Lamson-Scribner, chief of the insular bureau of agriculture:

"This is the plant of which Prof. Asa Gray said, 'Possibly affording an opportunity for one to make millions of blades of grass grow where none of any account grew before.' At the experiment stations of Louisiana, Mississippi, Georgia, and Florida it has given the heaviest yields of any of the forage crops grown, Georgia reporting 38,000 pounds of green forage per acre, Mississippi 44,000, and Louisiana the enormous amount of over 50 tons. It needs a long

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season of hot weather, a rich soil, and abundant moisture in order to succeed well, and it is useless to plant it where all these conditions can not be had. It is a remarkably vigorous grower, reaching 10 to 12 feet in height, with an unusually abundant supply of leaves and tender stems. The seed should be planted in hills 4 feet distant each way, at the rate of 2 pounds per acre."

Experiments made by the insular bureau of agriculture have demonstrated the adaptability of this grass to the Philippines, as indicated by the following account:

"From the table given below it will be seen that five cuttings were made from the plot in eight months, which is equivalent to nearly eight cuttings a year. The total yield of the five cuttings is 49½ tons green and 10¾ tons dry fodder per acre, or at the rate of 80 tons green and 16½ tons cured fodder per acre for the year. It is only fair to add here that the above figures are very low estimates. The second and third crops were damaged fully 50 per cent by locusts, and the four crops were obtained during the dry season, which was of unusual severity. This experiment shows that on well-fertilized land with frequent irrigation ten crops can be grown in one year, with a yield of 135 tons green and 30 tons dry fodder per acre.

"The following is a record of the yield and dates of cutting:

Date of cutting.	Height.	Yield per acre.	
		Green.	Dry.
	Feet.	*Tons.*	*Tons.*
March 21	5	12	2
April 20	2½	5	1½
May 18	2	4	1
June 29	5	12½	2½
August 10	6	16	4
Total		49½	10¾

"The high price of teosinte seed and the great demand for it in the islands suggests the advisability of growing a small area for seed purposes. The plot produced at the rate of 800 pounds of thoroughly cleaned seed per acre. At 60 cents gold per pound (the wholesale price of seed in the United States) the value of the crop from 1 acre is $480. Three crops of seed can easily be grown on the same ground in one year, which would mean a return of $1,440 per acre.

"Two acres of teosinte were planted June 6. Owing to the dry weather prevailing at that time the seed did not germinate until June 20. Previous to planting, the land was fertilized with 40 cords of stable manure to the acre, which was plowed under. Only two cultivations were given, the first on June 29 and the second on July 7, at which time the teosinte was large enough to completely shade the ground. On August 10, one-tenth of an acre was cut, and yielded 3,440 pounds of green fodder, or at the rate of a little over 17 tons to the acre. At the time this plot was cut the average height of the teosinte on the 2 acres was 6 feet. Five days later, August 15, another tenth acre was cut, yielding 5,395 pounds, or at the rate of nearly 26½ tons to the acre. This tenth of an acre was cut near the center of the field and may be taken as a fair average for the 2 acres. On August 19 the teosinte averaged 8 feet in height. The crop is being sold as fast as cut at $10 gold per ton. This gives a return of $265 gold per acre for each cutting. Allowing eight cuttings per year, which have been obtained here on a smaller area, the gross receipts, at this rate, from 1 acre would be $2,120 gold per year."

Cogon (*Imperata koenigii*) is a species of grass of general natural growth the young shoots of which afford excellent food for cattle. The grass is used in some localities as a substitute for nipa, where the latter does not grow, in thatching roofs. The name "cogon" is applied to many coarse, rank-growing grasses.

Sorghum (*Sorghum vulgare*), locally known as *batad*, is cultivated to some extent as a forage plant, and a considerable number of other varieties of useful gramineous forage plants grow in the mountain pastures and elsewhere in the islands.

Bamboo (*Bambusa*), several species of which grow luxuriantly throughout the archipelago. They are used for many purposes, principally in the construction of native houses, the frameworks of which are, as a rule, made almost wholly of these giant grasses. The bamboo poles used in house building

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are tied together and held in position by rattan (*bejuco*) and are thatched with cogon or nipa. The floors of the houses are usually of bamboo, and the posts, doors, window shutters, etc., are of the same material. These native houses are quickly and inexpensively erected by the natives, who are expert in their construction. Bamboo is also used for many other purposes, such as the making of boats, rafts, bridges, aqueducts, scaffolding, furniture, baskets, utensils of various kinds, fishing apparatus, weapons, rope, etc., while from finely separated filaments of bamboo, hats, cigar cases, and other articles are woven. The most useful variety of bamboo is that known as *Cauayang totoó*, which sometimes attains a diameter of over 20 centimeters and a height of more than 12 meters.

Nipa or *sasá* (*Nipa fructicans*) is a species of palm, having the appearance of a large fern, which grows only in marshy or muddy localities. It is indigenous to the coast, but is largely cultivated in places where there are marsh lands and is a highly useful plant.

It grows to a height of about 4 meters, and from its short stem arise large clusters of long compound leaves, which are used, wherever procurable, for thatching the roofs of dwelling houses. Sometimes churches and other public buildings are thatched with this material, and it is frequently used in the walls and partitions of the native houses.

From the sap or *tuba* extracted from the palm a liquor known as nipa wine, *vino*, or *bino*, is extensively distilled, which is used to a great extent by the people as a beverage. Large groves of nipa are grown in many localities for the sole object of producing tuba for purposes of distillation.

The nipa groves are started by planting the ripe fruits of the palm, usually between May and August, in holes placed about 1.7 meters apart; the frequent rains occurring at this season of the year usually keep the ground sufficiently wet to cause the seed to germinate and start a healthy, vigorous growth. Five or six years' growth is required before a nipa grove becomes serviceable.

The fruit of the plant grows in close-lying clusters at the end of a thick peduncle arising from the base of the palm; an incision is made in the peduncle immediately below the fruit and the sap flowing therefrom is collected in bamboo tubes hung to the plant, into which it drips. The incision is renewed and the sap collected daily for about ten months, the average production per plant being about 46 liters each season. The sap is emptied from the bamboo tubes into larger receptacles, in which it is carried to the distilleries. It is customary for the owners of large groves to give their workmen one-half the tuba they collect as remuneration for their labor. Fermented tuba makes a fairly good and largely used vinegar.

Cotton (*Gossypium herbaceum* L.), of long-staple variety, was formerly grown rather extensively in Ilocos Norte and a few adjacent provinces, but its cultivation was discouraged by the government in order to encourage growing of tobacco. The industry still exists, however, on a greatly reduced scale, and will probably hereafter increase.

A species of tree cotton (*Ceiba pentandra*) is found growing in a wild state in many of the islands; the cotton is useless for spinning purposes, the staple being very short, but it is used for making cushions and other articles.

The *pineapple* (*Ananas sativus* L.), of American origin, is cultivated in the Philippines, particularly in some of the Visayan Islands, more for the sake of the fiber found in its leaves than for its fruit, the latter not being very highly prized.

In order to obtain the greatest possible quantity of fiber, the young fruit of the plant is cut away, so that the leaves may grow longer and broader than they would otherwise; when the leaves are well developed they are torn from the plant and scraped with a fragment of glass or a sharp instrument, so as to remove the pulp from the fiber, which, when thus extracted, is washed, sun dried, and combed. The fiber is classified according to fineness and is woven into fabrics of exquisite beauty, very rough and primitive hand looms being used for the purpose.

Agave (*Agave vivipara* L.), or maguey, is another plant of American origin that is cultivated on a small scale in some parts of the Philippines, from the fiber of which a cloth called *nipis* is woven. The fiber itself has been exported in bulk to Europe, China, and Japan for many years.

Rattan (*Calamus*, Sp.), locally known as *bejuco*, is found throughout the islands in many varieties. It is a climbing plant, which sometimes attains a length of 200 meters, and is of great use to the natives, who employ it in binding the frameworks of their houses together. It is also used as rigging

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in small boats, in the construction of rafts, and for almost any purpose for which rope might be used. In some of the provinces hats and bagging, as well as chairs and other articles of furniture, are made of rattan.

Pandan (*Pandanus spiralis* Bl.), *buri* (*Corypha umbraculifera*), and *nito* (*Lygodium scandens*) are plants which furnish material largely used in the making of hats, sacks, and mats in different parts of the islands.

The buri palm is second only to the cocoa palm in the variety and usefulness of its products. The tree is not planted, but grows luxuriantly in many sections, birds being the sowers. It bears abundant crops of edible fruit, which is consumed by the natives, both raw and preserved in sugar. From the flowering-bud tuba, a highly prized beverage is extracted daily for a period of three or four months, more or less, after which the palm dies. From the tuba, vinegar is made; when fermented and mixed with the bark of the bacauan, it becomes a beverage called *basi*, which is very much relished by the people living on the island of Marinduque. When it is distilled an alcoholic liquor similar to that produced by distilling tuba extracted from the cocoa palm is obtained. When permitted to evaporate, a very fine syrup and sugar is formed. The young, tender leaves are used for making cloths. From the petioles of the leaves *buntal* is obtained, from which hats are made. The leaves are also used for making mats, sacks, and heavy wrapping material, and when boiled in water and bleached in the sun, are used in making a very fine quality of hats. From the trunk of the tree a starch food is extracted, as described on page 694. The variety and usefulness of its products render the buri palm one of the most valuable plants in the Philippines.

The hundreds of other fiber plants produced in the islands are not used sufficiently to justify their special mention; nevertheless many of them are very useful, and would undoubtedly prove of great value were they systematically produced and utilized.

The *camote* (*Ipomœa batatas*, Lk.), a tuber, is, aside from rice, the most widely grown and important food plant in the islands. It is a species of sweet potato, believed to have been brought from America. Leguminous plants are not as a rule extensively grown, though the *mongo* (*Phaseolus mungo*, Bl.), is cultivated on a considerable scale in some localities where it forms the principal food of the people. It is similar to but smaller than the lentil, and has the same flavor. The *butingui* (*Phaseolus vulgaris*, L.), or kidney bean, the *zabache* (*Phaseolus lunatus*, L.), the *sitao* (*Dolichos sesquipedalis*), the *frijol* (*Phaseolus lunatus* variety), and the *patani* (*Phaseolus lunatus* variety), and various other kinds of legumes are cultivated to a small extent and furnish vegetables and edible seed more or less highly esteemed.

The *gabe* (*Colocasia antoquorum* variety) is a plant the root of which is highly prized and extensively cultivated, especially in mountain districts; both the large roots and leaves afford excellent food. The *baidang*, grown principally in the Visayan Islands, is used in the same way as the gabe. Various other plants yielding edible roots are cultivated or grow spontaneously among which are the *ube* (*Dioscorea alata*), *tuque*, or *tugue* (*D. sativa*, L.), the *paquit* (*D. divaricata* L.), the *namiconot* (*D. pentaphylla*, L.), and the *tongo* (*D. papillaris*, L.), all of which have large roots. The tuque and ube are the most highly prized. Ordinary garden vegetables are cultivated in the Philippines to a very limited extent. There are gardens near Manila and other centers of population, managed principally by Chinese, but the natives scarcely ever engage in their culture. That nearly all vegetables grown in the United States can be produced in the islands has been demonstrated, and their production will undoubtedly increase as time passes and the wealth and population increase.

Among those cultivated are Irish potatoes, onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, squashes, and melons of different kinds, cucumbers, and a few native vegetables that are prized on account of their flavors and food values.

Of oil producing plants there are several kinds, in addition to the cocoa palm of which an account has already been given. Among these may be mentioned the sesame or *ajonjoli* (*Sesamun orientale*, L.), which yields *benne seed*, from which an oil is obtained somewhat similar to olive oil, which it is frequently used to adulterate. It can also be used in making soap, and the residue left after the oil is extracted is an excellent food for cattle. This plant is not as extensively cultivated as its merits justify.

The *lumbang* (*Aleurites moluccana*, Blume), plant is cultivated on a small scale, and its seeds yield an oil useful as an illuminant, for painting, for calking ships, and other purposes. After the oil has been extracted from the seeds

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the refuse is generally used as a fertilizer. The oil is exported in small quantities to China.

The castor oil plant (*Ricinus communis*, L.), is grown for its seeds, which produce an oil useful for medicinal and lighting purposes. A reddish illuminating oil is also extracted from a tree known in northwestern Luzon as *tavatara* (*Jatropha curcas*, L.), to the Tagalogs as *tuba*, and in Iloilo as *casta*.

The peanut (*Arachis hypogæa*, L.), locally known as the *mani* or *cacachuete*, is an oil producer of great value, but is cultivated in the Philippines on a small scale only, and is principally used as forage for cattle.

The dye plants most extensively produced and utilized in the islands in addition to indigo are the *sibucao* or *sapang* (*Caesalpinia suppan*, L.), from the wood of which a red coloring matter similar to logwood is secured; the safflower *alazor* or *catsumba* (*Carthamnus tinctorius*, L.), known locally as *biri* from the flower of which yellow and red dyes are obtained; the *agusip* (*Malastoma imbricatum*, Wall.), and the *bancudo* or *bancoro* (*Morinda bracteata*, Roxb.), a bright red coloring matter being derived from the bark of the first named and the root of the latter; the *bacauan* (*Rhizfora mucronata*, Lam.), the bark of which yields a reddish dyestuff; the balanti (*Homalanthus fastuosus*, F. Vill.) and the *cunalon* (*Diospyros cunalon*, A. D. C.), whose bark furnishes a black dyestuff; and the *salicsican* (*Morinda umbellata*, L.), from whose roots a red coloring matter is extracted.

Among starch-producing plants are the *cassava*, or *yuccu* (*Manihot utilissima* Pohl.), called in the Philippines *camoteng cahoy;* the arrowroot or *maranta*, locally known as *tagbac-tagbac;* and several varieties of palms, the most important of which is the *buri* (*Corypha umbraculifera*), which is famed throughout the archipelago. The island of Burias acquired its name from this growth, which is very abundant there. The starch from this tree, commercially known as sago, is obtained by cutting down the tree at the root and taking out the soft interior portion of the trunk, which is placed in casks or troughs and the bitter sap drained off. It is then subjected to a pounding with paddles or mallets which separates the starch into fine grains. The starch is gathered and dried and converted into flour. It is a palatable, nutritious food; and in Burias, Bohol, Masbate, and other sections where it is produced in abundance, largely takes the place of rice as a food stuff. The natives extract the juice from this plant by making an incision in the fruit, from which a beverage is made. Other varieties of starch-producing palms are the *bagsang* (*Caryota rumphiana* Mart.), which is quite common in the Visayan Islands; the *lumbia or lumbay* (*Metroxylon silvestre* Mart.), the *cáuong* (*Arenga saccharifera* Labill.), and the *pagahan or baugan* (*Caryota urçus* L.), from each of which the starch is obtained from the heart of the tree trunk.

The nutmeg (*Myristica fragrano* Houtt.) grows naturally in Cebu and the Province of La Laguna, and can be made to grow by cultivation in most sections of the islands. Cinnamon of superior quality is found growing spontaneously in widely separated sections of the island of Mindanao, and on some of the other southern islands; black pepper (*Piper nigrum* L.) is also found, and is cultivated to a slight extent.

The *ikmo* or *betel* (*Piper betel* L.), is a climbing plant, cultivated with much care in every province. The leaves are used in preparing the chewing mixture called *buyo*, as follows: A leaf is coated with lime, or a small piece of lime is placed in it. It is then folded, and wrapped around a slice of the nut of the *arica palm*, known as the *betel nut*, which is also extensively grown. The leaf of the *buyo de anis* is also sometimes used in connection with that of the ikmo in preparing buyo.

The natives are in the habit of chewing the buyo, which they claim is healthful and beneficial, though this is a matter of doubt. After having become addicted to the habit of buyo chewing, it is said to be as difficult to cease using it as it is for those accustomed to using opium or tobacco to abandon their use. The buyo chewing habit is general in the Philippines with both males and females.

No attempt will be made in this report to enumerate the large number of medicinal plants found in the islands. Many of them thought to be of value are of doubtful utility, while others of possible great value have not been fully identified and classified, so that any list of such plants that might be given would not only be faulty, but possibly misleading. It may be said, however, that the botany of the islands is extremely rich in an enormous variety of plants possessing beneficial properties, among which it is believed remedies may be found adapted to many kinds of human ailments.

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Fruit.

Fruits, both wild and cultivated, abound in great variety in the Philippines, some of them being of superior quality, although, as a rule, their flavors are not equal to those of American fruits. Under proper horticultural methods, with the favorable soil and climatic conditions prevailing in the islands, their quality will improve, and those that are now deemed somewhat inferior will equal or surpass similar fruits grown anywhere in the world. Certain fruits have been recently introduced from the United States, such as grapes, blackberries, figs, and strawberries, and have grown and developed perfectly in the province of Benguet.

A descriptive list of the best known and most generally used Philippine fruits is given in "El Archipiélago Filipino," published by the United States Government in 1900, upon which the following description, given in the "Pronouncing Gazetteer and Geographical Dictionary of the Philippine Islands" (published by the Bureau of Insular Affairs, United States War Department, in 1902), is based:

ANONA (*Anona reticulata* L.). An exotic from Mexico, its meat being white and soft, and containing, like the ates, small, black pits; is sweet and fragrant, and has an exterior appearance resembling the common custard apple or bullock's heart.

ATES (*Anona squamosa* L.). Juicy, aromatic, very sweet, very soft, and somewhat peppery; a table delicacy.

BALIMBING (*Averrhora carambola* L.). Has the flavor of a quince, and is used by the natives as food with dry fish or meat.

BANANA. The commonest and cheapest fruit in the Philippines, there being a large number of species, varying greatly in form and taste. It is called *platanó* by the Spaniards, and *saguing* by the Tagalogs. The trunk of the banana tree is not solid, but soft and full of minute little tubes or acqueducts, which serve to conduct the sap which sustains and matures the plant within the short space of one year. Shortly after the fruit ripens the plant begins to decline and the leaves dry up and fall. The fruit grows in bunches of various shapes, according to the species. Important varieties: *Lakatán*, very similar to the ordinary American banana; *latundan*, less yellow and sourer than the preceding, being noted for its digestive qualities; the *saba*, which makes a most delicious fritter; the *hanipa*, sweeter than the saba, and cultivated principally in Samar and Leyte; the *tambonan*, a very common and healthful species; the *camada*, very large; the *tundoc*, also large, the skin of which is of a violet color; the *binalátong*, larger, more delicate, and more fragrant; the *torlangdato*, called in Spanish "the lady finger;" the *pilbitin*, a small, sweet, and rich variety; the *tarip*, the *bungaran*, the *putian*, the *dariao*, the *mungco*, the *talood*, the *tinumbaga*, the *dariyas*, the *bungulan*, the *gloria*, and others. P. Delgado enumerates and describes 57 varieties.

CAMIÁS (*Averrhora bilimbi* L.). When green, has an agreeable sour taste, but when ripe is sweet and fragrant; is often pickled or candied, and its juice removes the stain of iron rust and other spots from linen.

CANTALOUPES. Of excellent varieties, especially in the provinces near Manila.

CHICO. Two varieties; the *chico sapote* or *sapote* (*Achras sapota* L.) and the *chico mamey* or *chico* (*Lucuma mammosa* Gaert). The sapote is an evergreen tree, with thick shining leaves and milky juice; a native of tropical America. Its fruit is about the size of an orange, green on the outside and black on the inside, sweet, and makes excellent preserves. The chico is smaller, the skin and pulp of deep brown, with brilliant black seeds embedded in it. It contains a pleasant-flavored pulp resembling quince marmalade in appearance and taste.

CITRON. Fruit very large; is found in abundance.

DUHAT (Lomboy) (*Eugenia jambolana* L.). A tree of hard and durable wood; produces a wild, edible fruit, dark purple to black in color, about the size of an olive. Its astringent bark is used in dyeing, tanning, and in medicine.

GUANÁBANO (*Anona muricata* L.). Pear-shaped, being similar in exterior appearance to the pineapple, containing an agreeable, slightly acid pulp; used for preserves.

GUAYABA (*Psidium guayaba* L.). A Tagalog bayabas; when ripe is of yellowish color, and very aromatic, as are the leaves. The pulp is acid, and has different color, according to the varieties, white, yellow, and pink. The

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interior is filled with little hard seeds or pits, which are embedded in the meat. It is a carminative and an excellent jelly and marmalade. Natives use this fruit as food.

LANGCÁ or NANGCA (*Artocarpus integrifolia* Willd.). Is perhaps the largest found in the world, some as large as a good-sized water jar. The ripening fruit is recognized by its aromatic and penetrating odor. The fruit cut shows a large amount of yellowish or whitish meat, of which preserves and sweetmeats are made, resembling the date, with an odor like musk. The seeds when boiled or baked resemble the chestnut. The wood of the tree is yellow, solid, durable, and very serviceable for working.

LANZONE (*Lansium domesticum*) Jack or Boboa. Is beautiful in appearance and gives a cool shade. The leaves are of a beautiful clear green. The fruit is a yellow berry, the skin being bitter, thin, and fine. Within it are contained fine divisions, as in the lemon, but the flesh is crystalline white, almost transparent, sweetish sour, quite delicate, and very refreshing. This fruit is healthful for those who suffer from heat. The best kind of lanzones grow in La Laguna, Luzon.

LEMONS. Seven varieties of this fruit, some of superior quality.

MABOLO (*Diospyros discolor* Willd.). Is about the size of a quince and contains a large seed. The skin is reddish and velvety. The flesh is white and sweet, but somewhat indigestible, and has a rather strong odor.

MACUPA (*Eugenia malaccensis* L.). About the size of a sweet pepper and of somewhat the same shape, rather larger and quite red in color; more lustrous; bittersweet in taste, somewhat agreeable, but has no solid flesh which can be eaten.

MAMPÓN or PAJO (*Mangifera altissima* Blanco). Very similar to the *manga*, frequently preserved in brine in the form of pickles; also made into sweetmeats and preserves. There are other small varieties about the size of an olive, which are used in making pickles and preserves.

MANGA (*Mangifera indica* L.). One of the most exquisite fruits in the world, and the queen of the Philippines. The largest is from 6 to 7 inches in length; flattened. The skin is yellow and rather fine; the interior a fleshy, fibrous drupe, but sweet and delicate. The pit in the center is almost as long as the fruit itself, but very thin. The leaves are long, wide, and dark green, and an infusion of them somewhat resembles tea. The manga is used as a food, not only when ripe (April), but when green. It is used also for preserves, jelly, and marmalade. The natives make the boiled manga into a kind of relish of sweet-acid flavor, as palatable as the Indian chutney. The best mangas come from Imus, Cavite, Luzon.

MANGOSTEEN (*Garcinia mangostana* L.). An exotic fruit, grows only in Jolo and some points of Zamboanga and Cotabato, where it is called the "king's fruit," because it is so highly prized by the Moro sultans. It is dark red or purple, and about the size of a small orange. The edible and juicy parts form small, white divisions; very soft; found in the interior; covered with a double skin, reddish in color, and which must be removed before the fruit is eaten. The rind of the fruit, as well as the bark and wood of the tree, is very astringent, and has been used in medicine.

ORANGES of various indigenous species are found. The principal is the *cajel*. Another the *naranjita*. There are several wild species, one of which is called amumintay. They are very large, being 12 or 13 inches in circumference, have a thick skin, are very juicy and bitter.

PAPAYA (papaw) (*Carica papaya* L.). Two sexes. The male produces panioles of small, white, aromatic flowers; the female yields fruit. The tree resembles a palm, with large broad leaves. The fruit resembles a small squash in appearance, is ordinarily 10 inches long, commonly of an oblong form, ribbed, with a thick, fleshy rind, and sweet. When it ripens the skin changes from green to a reddish or yellowish color, as does the flesh also. It is sometimes eaten raw or made into a sauce, or when green is boiled as a vegetable and pickled, in combination with red peppers, spices, radishes, and onions, forming a nice hors-d'œuvre, with a yellow sweet-acid sauce, called *achora* by natives and Spaniards alike. The seeds are an efficacious vermifuge.

PINEAPPLE (*Ananas sativus* or *Ananasa sativa* Lindley). Has a fine flavor, aromatic and slightly tart, on account of the presence of malic acid. It is of more importance, however, as a textile plant.

RIMA (*Artocarpus incisa* L.). Composed of the numerous small female flowers united into one large, fleshy mass about the size of a child's head, and is

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covered with hexagonal marks externally, which are the limits of the individual flowers. The flesh is a substantial food, and on this account it is called the breadfruit plant. It is either boiled or roasted and then eaten with sugar or syrup. It is also made into preserves.

SANTOL (*Sandoricum indicum* Cav.). Similar to the peach, but larger and the rind thicker. Inside there are several divisions, as in the mangosteen, of a white color and bittersweet taste, each division containing a hard pit with carminativé qualities. It is used principally for preserves and pickles, although it is eaten raw when ripe. Bulacan, Luzon, produces the best *santols*.

SÁPOTE (*Diospyrus ebenaster* Retz) and *pagápat* (*Diospyrus kaiki* L.), are natives of China. Among the large number of wild species of fruits found in the Philippines in general, sour, sweet, and somewhat carminative, may be mentioned the *doctoyan*, the *pananquian*, the *durion*, the *abult*, *amahit*, *angiap*, *amaga*, *agononan*, *abubunanu*, *alanganisan*, *dae*, *amamampang*, *bonano*, *harobor* or *marobo*, *cabaan*, *carong*, *cagos*, *gayan*, *dalinson*, etc., which are described by P. Delgado.

TAMPOY (*Eugenia jambos* L.). About the size of a small apple, the flesh being soft, sweet, and having an odor like roses. In color and shape it resembles a *guayaba*.

There is a large number of trees and plants in the Philippines that yield resins, gums, and waxes, none of which can be classified as agricultural, as they are not cultivated, nor is their growth fostered at present in any way other than by forestry regulations governing the cutting of timber. Many of them are susceptible of profitable cultivation, particularly trees yielding gutta-percha, which are found growing wild in many portions of Mindanao, and rubber-yielding trees and vines which grow in abundance in several of the southern islands, and can be made to grow luxuriantly almost anywhere in the archipelago by cultivation. Considerable business was carried on in former years in the collection and exportation of gutta-percha and rubber, but adulterations made by Chinese traders in these gums have caused the insular products to become discredited, and very little is now exported.

Essences or essential oils for perfumery purposes are obtained by distillation from the blossoms of three trees in the Philippines, the most important of which is the ilang-ilang (*Cananga odorata*, Hook). This tree is cultivated to a slight extent, but the wild growth on the mountain sides is principally utilized. It bears a profusion of small, highly fragrant blossoms of a greenish color, from which the greatly prized and valuable oil, bearing the same name as the tree, is extracted. This product is exported to France and other countries, where it brings highly remunerative prices.

The *sampaguita* (*Jasminum sambac* Ait.) yields white, fragrant flowers, from which a rich, agreeable perfume is extracted in limited quantities.

The *champaca* (*Michelia champaca* L.) is a conically shaped tree that grows to a height of about 4 meters. It is found in the mountains, but is cultivated in gardens, and from its flowers a well-known perfume is extracted.

There are various other growths from which essences or essential oil may be derived, but the three before mentioned are the only ones utilized as far as is known.

Antiquated methods and lack of enterprise.

Although agriculture, as has been stated, is the principal occupation in and chief source of wealth of the Philippines, it is conducted along very primitive lines and by antiquated methods that restrict production by failure to thoroughly till the soil, to gather full harvests, or to bring under cultivation the amount of land that, with modern methods and appliances, could be attended to with no greater expenditure of labor than is now used on small areas.

The plowing of land preparatory to the planting of crops is of the most superficial character, the surface of the ground not being disturbed beyond a depth of 2 or 3 inches; plows with a single handle and a small wooden share, sometimes tipped or edged with iron, are drawn by a slow-moving carabao, and merely scratch the earth. After plowing, the ground is frequently gone over with a rude wooden harrow drawn by the carabao, and such cultivation as is subsequently given a growing crop is very meager. The hoe, spade, and shovel, as used in the cultivation of field and garden crops in the United States, are practically unknown. The implement used almost universally by the Filipinos is the bolo, a short sword, which is used for all sorts of purposes, such as felling

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trees, cutting down weeds, digging holes, stirring the soil between growing plants, etc.

Improved machinery, either for purposes of cultivation, harvesting, or preparation of the product for use, has scarcely any place in the economy of the Filipino farmer, but crude appliances and hand methods are almost universally in vogue.

Attempts that have been made since American occupation of the islands to introduce modern agricultural machinery have met with but slight success. Such implements and machines as have been imported and sold by commerical houses have mostly been disposed of to Americans or to the insular government for the use of the bureau of agriculture. The natives have made very few purchases.

A leading commercial house of Manila that since 1900 has handled about 90 per cent of all modern agricultural machinery brought to the islands states, in response to an inquiry from the director of the Philippine census, that during the three years they have been engaged in the business they have sold about 110 Deere plows of from 6 to 12-inch sizes, 6 heavy railroad plows, 3 middle-breaking plows, 2 breaking plows, 3 gang plows, 2 disk harrows, 5 50-tooth "Ajax" harrows, 3 15-tooth vineyard harrows, 5 hand corn shellers, 4 one-hole corn shellers, 2 rice hullers and polishers, 2 rice fans, 2 rice thrashers, 2 hand-power grain mills, 3 hay mowers, 3 steel hayrakes, 4 garden seeders, 4 garden cultivators, 25 hand-power feed cutters, and about 100 each of Giant 5-tooth and Planet, jr., cultivators.

The stock carried by the company referred to consists not only of the articles of which sales have been made as above specified, but of many other implements commonly used on farms in the United States. The manager of the company makes the following statement, under date of August 14, 1903:

"At this writing we can see no encouragement whatever as to the Filipino taking up the use of modern machinery in preparing the soil. Of the above-mentioned implements the railroad plows, middle-break plows, breaking plows, gang plows, disk harrows, common harrows, rice hullers, fans, and thrashers have all been sold either to the military authorities or to the insular purchasing agent. The natives have purchased a few of the plows, probably 50 altogether, and probably 50 each of the 5-tooth and 12-tooth cultivators. These cultivators were sold mostly on the island of Negros for use in cultivating sugar. We believe we have handled far more agricultural machinery than all other companies in Manila put together, and from our experience we can say nothing that would be encouraging as to the native adapting himself to modern machinery. * * * We do not think there is a native in the Philippine Islands who has the slightest conception of the different classification of plows as applied to different soils and for different purposes. For instance, he does not understand or appreciate the difference between the common wood-beam plow, the low landslide plow, the stubble plow, the small stirring plow, the sugar plow, the turf plow, the subsoil plow, the special alfalfa plow, the root-ground plow, the vineyard plow, the breaking and middle-breaking plows, or the listing plow. He does not understand the use of the disk or the coulter.

"American modern machinery is made to be used with horses mainly, and the native naturally finds himself handicapped in the beginning. His carabao will pull a small 6 or 7 inch plow and a small cultivator or harrow; beyond this he can do nothing and his ideas lead him to believe he must use steam power or electricity. * * * The native does not understand the value of the farm wagon in transporting supplies to and from market, and prefers the ancient carabao cart."

Another prominent Manila importing house writes as follows:

" * * * We have imported quite a lot of samples (of American agricultural machinery) from which we have endeavored to make sales, but have thus far found it impracticable, owing to the fact that our American apparatus is made up in such a way that it is extremely difficult (and in many cases impossible) to adapt it for use with carabao, and it is too heavy for use with ponies.

"The only exception we have found to the above is small light plows and cultivators, but it is difficult to prevail upon the natives to change from their old customs until they can be shown the advantages which will accrue, which is being done to a considerable extent by the bureau of agriculture.

"The great dearth of work animals during the past few years has also doubtless contributed considerably to the lack of demand for agricultural impli-

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ments, but the government importations of carabao will, in all probability considerably alleviate, if not entirely eliminate, this factor.

"The machines which we have imported * * * have been mostly sold to Americans. The number of natives looking for these things has been very small."

It may be safely predicted that when the slow, wasteful, ancient methods of agriculture in the Philippines shall have given place to modern ones, the wonderful productivity of the soil, and the great demand for and highly remunerative prices brought by the leading agricultural products will afford a surprising degree of wealth and prosperity to the islands.

Domestic animals.

The principal domestic and farm animals of the Philippines are the carabao, or water buffalo, neat cattle of Australian or Indian origin, horses, swine, and poultry. Goats and sheep are of slight economic importance and are found in limited numbers only.

The carabao is the most important animal in the archipelago. As in other oriental countries, it is not only the mainstay of agriculture, but is also extensively used as a draft animal and beast of burden. The country from which it was originally introduced is unknown, carabao having been found in the islands when the Spaniards first assumed dominion.

The following translation from the *Guía Oficial de Filipinas* gives an interesting description of this highly prized animal upon which the development and prosperity of the country so largely depend:

"The carabao, or water buffalo, is the most notable quadruped found by the Spaniards when they came to occupy these islands. There are few animals which are as ugly, but there are also few which are more useful in agricultural labors and which can resist the enervating climate of the Philippines better.[a] Its color is black or brown; the hair is very scarce; the horns large, arched, and rough; and the head is comparatively small. Its strength is enormous. It easily swims the widest rivers, and can haul very large loads, although its progress is slow and its movements awkward. It likes humidity and to roll in the mud. The hide and horns of the carabao are of great commercial value. The carabao begins to work after it is five or six years old. It lives to about thirty years.

"The wild buffalo is to be feared. In its savage state it constitutes a real danger to man if met in the woods."

The calamity which has befallen the islands in the decimation of the carabao by rinderpest has been referred to elsewhere in this report.

Neat cattle of Australian or Indian origin are bred in large numbers, and are used to some extent for agricultural purposes. Their principal value, however, has consisted in their use as food, and in their hides and horns, which have been exported in considerable quantities.

The horses of the country, of which there were large numbers prior to the recent widely spread prevalence of an equine disease known as surra, which has slain them by thousands, are of the pony variety. Though of small size, they are strong and full of spirit, hardy, and consequently very useful. Some of them are very fast for short distances and make good race horses.

The swine of the islands are of poor breed, resembling the kind familiarly known in the United States as "razorbacks." Their flesh is of fairly good flavor, and is much prized as a food by the natives.

The poultry of the country consists principally of gamecocks and hens and their offspring, a few of which nearly every Filipino family is the possessor. Cockfighting is the national sport of the people, and the breeding of game roosters, though not capable of statistical presentation, is an important branch of insular employment, the sociological and economic effects of which can not easily be measured. The average Filipino thinks much more of his gamecock and the sport to be found in the cockpit than he does of the food value of his poultry and eggs.

Ducks and geese are also bred; in some localities the former are found in large numbers. In the Province of Rizal, on the Taguig and Pasig rivers, not

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[a] The author of this description should have said "there is none" instead of "there are few more useful and better able to resist the effects of the climate." *Director.*

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far from Manila, duck raising is conducted on an extensive scale, being the principal industry of the inhabitants of the pueblo of Pateros. The breeding yards are fenced in with bamboo on the river banks and in these the full-grown ducks are confined during the day; in another inclosure nearby the partially grown ducks are kept; and in a third the ducklings are kept, the latter being separated from their elders as soon as hatched. Not far from the duck yards are the duck houses, a separate house being provided for the young, the partially grown, and the full-grown ducks, to which they are trained to go, each class to its respective domicile, at sunset; and every morning at dawn they leave their houses in orderly manner and enter their proper yards with almost military precision. The eggs are hatched artificially, usually in batches of 1,000, by being placed between bags of heated rice husks; and in this manner many thousands of ducks are produced annually, from the sale of which in Manila and neighboring towns considerable profit is derived. The general rule of the duck growers is to sell male birds only, the females being kept for breeding purposes.

The few sheep and goats in the islands are usually semiwild, of poor varieties, and of very little value.

Considerable light is thrown on general agricultural conditions in 1903 by the provincial governors and census supervisors in reports made by them to the director of the Philippine census immediately after the census of the islands was taken. Their statements in regard to this subject have been largely used in preparing this report.

Fruits, Vegetables, and Fiber Plants.

[By Hon. F. Lamson-Scribner, chief of the insular bureau of agriculture.]

All races of men who are wholly or largely dependent upon their own resources for food, raiment, and the common necessities of life, acquire close familiarity with the plants about them, and the Filipinos illustrate this fact in a marked degree. They have discovered uses in a multitude of native plants which a more highly civilized and less primitive people would never have learned to recognize. The numerous plants whose products are utilized for food, together with the great number of fiber plants contained in this list, illustrate this statement. Had the list included all the gum and resin bearing species and those of reputed medicinal value known to the natives, the truth of the statement would have been even more strongly emphasized. As it is, one can not fail to appreciate the wonderful resources of the Philippines in its vegetable and plant products.

The preparation of this enumeration of fruits, vegetables, and fiber plants of the Philippines was made possible by the many and intelligent reports rendered by the correspondents of the insular bureau of agriculture in all parts of the archipelago which were sent as replies to certain inquiries issued by the chief of the bureau, and it is upon these reports that the information here presented is chiefly based. There were many names reported which have been omitted because of lack of sufficient data concerning them, and, as will be seen, there are many plants among those yielding fibers which are yet unclassified. The list is, however, as complete as the material at hand will permit at this time, and it is believed that its presentation will not only afford useful and interesting information relative to the resources of the islands, but be a guide and assistance to others who may wish to take up the study of the economic plants of the Philippines.

* * * * * * * *

Alcoholic plants.

Buri.—The buri palm was reported in 24 provinces, and in all islands embraced by Table 19.[a] The area for the archipelago is given as reported on the schedules, but for the reason given this total can not be accepted as indicating the amount of land devoted to buri, because this palm is not, as a rule, planted in groves with defined boundaries, but is set out at random—a tree here and a tree there—and consequently a correct statement regarding area is well-nigh impossible.

[a] This table has been omitted.

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The use of the palm for the production of the starch food commercially known as sago was greatest in the province of Iloilo and on the island of Panay. In the production of this food the palm is cut down and the starch extracted from the trunk.

The leaves of the buri palm are used in making hats, mats, and other woven articles of domestic use. Of the provinces, Pangasinán was the largest producer along this line and of the islands, Luzon. The fruit is edible and greatly prized, and was most largely produced in Cebu Province and island.

Tuba, the sap extracted from the palm, is used as a beverage, and also for the distillation of alcohol. More liters of this liquid were gathered in the province of Batangas and on the island of Luzon than elsewhere.

Nipa.—The nipa palm is cultivated in 29 provinces. It is a highly important growth, and the leaves are used in the construction of the houses in which the natives live, while its sap, or tuba, is extensively used in distilling alcohol.

The largest provincial area devoted to the growth of nipa was in Pampanga, in which there were 7,195 hectares out of a total of 29,258 hectares for the archipelago; and on the island of Luzon, 21,749 hectares were planted in this useful palm. The province and the island named were the largest producers of nipa leaves, the first producing 117,404 thousands and the latter 131,434 thousands out of a total production of 138,875 thousands of leaves in the entire archipelago.

Tuba was more largely extracted from nipa palms in the province of Capiz, in which the production amounted to 39,877,059 liters, than in any other province; Bulacan ranked next, with 31,228,314 liters, and Pampanga third, with 13,733,031 liters; the production in no other province reached 5,000,000 liters. Of the islands Luzon headed the list with a production of 45,040,073 liters, and Panay stood next, with 41,234,800 liters; no other island produced as much as 4,000,000 liters. The total production in the archipelago was 103,311,680 liters.

Aromatic plants.

Cocoa.—Cocoa, otherwise known as cacao, was cultivated to a limited extent in all the provinces except Benguet, Lepanto-Bontoc, and in the comandancia of Siassi. Only 11 provinces had as much as 100 hectares devoted to this useful and profitable culture; the cultivated area in other provinces ranged from 1 to 99 hectares, the total number of hectares in all of them amounting to only 764 hectares.

Fiber plants.

Cotton.—The culture of cotton was much more important in former years than it is at present. Its cultivation is, and always has been, almost wholly confined to the island of Luzon, the quantities grown in other islands being comparatively insignificant. In 1902, more than half the cultivated area on the island named was in the province of Ilocos Norte, in which there were 1,591 hectares of land in cotton, and the quantity produced was 605,029 kilograms; the adjoining province of Ilocos Sur produced 244,140 kilograms on 645 hectares, the combined area of the two provinces constituting 73.2 per cent of all lands (3,053 hectares) devoted to the staple in question, and their aggregate production being 64.2 per cent of the 1,322,118 kilograms grown in the entire archipelago. Only two other provinces, both on Luzon Island, had an area in excess of 100 hectares in cotton—Batangas, with 239, and La Union, with 266, upon which there were reported as produced 21,206 and 362,434 kilograms, respectively. The combined cotton area for the 17 remaining provinces and comandancias in which the fiber was produced was only 312 hectares, and their total production, 89,286 kilograms.

Pineapple.—This plant, which is principally grown for the fiber yielded by its leaves, is found in most of the provinces and principal islands. Its fruit is also utilized to a considerable extent, particularly in the province of Bataan, from which no fiber was reported, the entire product of 30 hectares consisting of fruit which found ready market in the near-by city of Manila. In the entire archipelago the total reported area in pineapples was 613 hectares, upon which the production in 1902 amounted to 952,400 fruits and 292,403 kilograms of fiber. More than half the area and fruit production were in provinces on the Island of Luzon, and 46 per cent of the fiber was produced in the same provinces.

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Fruits.

Bananas.—This highly important fruit grows in every province and inhabited island of the Philippines, both in the wild and cultivated state, and numbers over 50 varieties, some of them of unexcelled delicacy and flavor. The statistics regarding its production and area are interesting only as indicating the extent to which the natural, spontaneous growth has been supplemented and added to by such industry as the natives have exerted in setting out plants in the vicinity of their homes, which after planting receive very little, if any, attention in the way of real cultivation.

The entire cultivated area devoted to the banana in the archipelago was reported as 33,913 hectares, upon which 14,078,600 bunches of the fruit were said to have been produced. As in all other products except sugar, provinces on Luzon produced more than those on any other island. The largest cultivated area and production of any single province was in Leyte, which shows a yield of more than double that of any other.

Betel nuts.—The use of the betel nut by the natives rivals that of tobacco, the latter being used almost exclusively for smoking, while the former is chewed. As a cultivated product, however, its area of production and yield are not extensive, and there are 19 provinces and 7 principal islands in which no production whatever was reported or the quantity reported was so insignificant as to be unworthy of mention. Only 6 provinces and 3 principal islands show cultivated areas of 100 hectares or over; the total area for the entire archipelago was 2,572 hectares, upon which 525,577 thousands of nuts were produced.

Cocoanuts.—The planting of cocoa palms in groves throughout the archipelago generally has very materially added to the area upon which this useful tree grows. The wild growth, though no statistics regarding it can be given, is known to be enormous—probably greater than that designated as cultivated; and, as is the case with most other Philippine agricultural crops, the data given in the tables regarding the extent to which the tree is cultivated (i. e. planted) and the quantities of its different products, are useful only as indicating the extent to which native energy has been applied in increasing the natural, unaided growth.

The product of greatest commercial importance, the exports of which to the United States and Europe are steadily increasing in volume and value, is copra, the dried kernel of the cocoanut; enormous quantities of tuba are also drawn from the trees, and the oil derived from the nuts is used by the inhabitants for illuminating and other purposes, as explained in previous pages.

Guavas, lanzones, and oranges.—These fruits are not cultivated to any great extent. The largest areas devoted to guavas were in the provinces of Tayabas and Ambos Camarines, in which 211 and 173 hectares, respectively, were reported as planted in this fruit. The cultivated area did not amount to as much as 100 hectares in any other province or district. The total amount of such area was only 1,052 hectares, and the total reported production for the entire archipelago was only 496,575 hundreds of the fruit. Lanzones were cultivated on a still more limited scale. The total cultivated area was returned as 614 hectares of which 417 were in the province of La Laguna, and the total production was given as 67,585,686 liters, of which nearly 97 per cent was grown in the province named. The reports show that 100,178 hundreds of oranges were gathered from trees planted on 871 hectares in all the islands. Five hundred and forty-seven hectares in Batangas Province, Luzon, were reported as yielding 62,115 hundreds. In other provinces and islands the cultivated area and crop were insignificant.

Mangoes.—The mango, sometimes designated as the "king of fruits," attains its greatest perfection in size and flavor in the Philippines. It grows wild in most of the inhabited portions of the archipelago, and is shown by the census returns to have been more extensively cultivated than all other fruits combined, except bananas and cocoanuts. Though the separate cultivated areas are small, their aggregate amounted to 3,317 hectares, which produced something over 100,000,000 of the fruit.

Gramineous Plants.

Corn.—This cereal, locally known as maize, is cultivated more or less extensively in all the provinces and principal islands. The total area in 1902 was reported as 107,981 hectares, upon which 1,195,254 hectoliters of the grain

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were produced. This is one of the few Philippine crops requiring cultivation, therefore the data given in the tables may be taken as representing its entire area and production.

Grass.—Many varieties of grass are grown in the islands for stock feeding purposes. When cut it is usually tied in small bundles immediately and used in its green, uncured state. Several crops are ordinarily cut from the same meadow each year and, as it is not weighed but sold by the hundred bundles, which are of various sizes, according to the kind and quality of the grass and the custom of cutters and purveyors in different localities, the number of kilograms produced can only be estimated. The largest areas and yields are naturally in provinces containing cities or in those situated near centers of population. Of the latter class is the Province of Rizal, adjoining the municipality of Manila, in which nearly 20,000,000 kilograms are reported as having been produced—more than half the reported production of the entire archipelago, which is given as nearly 37,000,000 kilograms. About 3,000,000 kilograms were produced within the corporate limits of the city of Manila. The only other provinces producing 1,000,000 kilograms and upward were Albay, Iloilo, and La Union. Of the islands, Luzon produced nearly 30,000,000 kilograms, about 80 per cent of the entire yield, the only other important producing island having been Panay, upon which a little over 6,000,000 were reported.

Paddy (unhulled rice).—The production of rice is the most important agricultural industry of the Philippines, as far as the domestic economy of the people is concerned. When obtainable, it is the principal vegetable food of nearly all Filipinos, who, in common with the populace of other oriental countries, value it more highly than any other comestible. The islands have not, for many years, produced this article of prime necessity in sufficient quantities to supply domestic requirements, and the annual deficiency has been made good by imports from foreign countries. In 1902 the reported insular yield amounted to 8,599,233 hectoliters from 592,766 hectares of land, an area far in excess of that devoted to any other cultivated crop; in addition it was necessary to import something over 290,000,000 kilograms of the grain to meet the requirements of the people. This condition is likely to continue indefinitely, it being more profitable to raise other crops, particularly hemp. The proceeds derived from the sale of hemp from a given amount of land will purchase much more rice than could be grown on the same area, and as long as this remains true the islands will undoubtedly depend to a large degree on importations of the grain.

It is grown in every province, comandancia, and principal island of the archipelago, though in some of them the quantity produced is small. The average yield per hectare in all the islands in 1902 was 1,451 liters, from which there were wide variations in the different provincial and insular sections.

Beans, gabe, and tomatoes.—These three vegetables are cultivated to a comparatively small extent in most of the islands and provinces. In a majority of them the production is too small to be of other than slight local importance. The total cultivated area reported for all three amounted to only 6,694 hectares, of which 3,170 were in beans, 2,271 in gabe, and 1,253 in tomatoes. The total production of each was reported as follows: Beans, 1,752,283 liters; gabe, 4,827,155 kilograms, and tomatoes, 2,856,341 kilograms.

Sweet potatoes.—The tuber known throughout the islands as "camote" is, in point of importance, a domestic food product second only to rice. It grows profusely and yields abundantly in all sections, and is a favorite article of diet. The cultivated area and yield of this vegetable by no means cover the extent to which it is grown and produced; they only indicate the degree to which the natives have exerted themselves in its production. When once planted, the sweet potato is said to grow with very little or no further attention, and spreads without cultivation into new ground, yielding what are sometimes called "volunteer" crops in large quantities.

As compared with average or normal yields, the crops of all kinds gathered in 1902 were very small. The destruction of carabao and horses by rinderpest and surra, the devastations of insect pests, the prevalence of drought in many sections of the archipelago, and the ravages of cholera inevitably resulted in heavily diminishing the yields of all agricultural products.

Effort was made, through inquiries in Schedule No. 5, to secure statistics along this line, but the lack of records and the prevailing inability of the agricultural population to supply definite information regarding yields of previous years, as compared with those of 1902, prevented the securing of specific data.

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Information of a general character was, however, obtained, upon which it is possible to base the statement that the yield of crops was on the whole not more than half the normal amount.

The special agents attempted to secure data regarding the agricultural pursuits of the non-Christian tribes in the different provinces and islands inhabited by them, as called for by the schedule used in enumerating the wild tribes.

Before the census was taken, it was not believed to be practicable to secure this information in such detail as to be of statistical value; nevertheless, the effort was made. The results of the canvass verified the expectations regarding their probable lack of completeness. It was found that the furnishing of information regarding areas and quantities of production was quite beyond the capacity of the wild people who, as a rule, have no proper conception of the meaning of numbers and who were totally unable, except in occasional instances, to answer questions, the replies to which involved the giving of mathematical expression to agricultural operations.

All that could be done, in most cases, was to secure lists, more or less complete, of the different products derived from the soil by the various tribes; approximate numbers of different kinds of domestic animals owned by them, and a little meager information regarding their industries aside from that of agriculture.

With regard to their farming, it is sufficient to say that they cultivate substantially the same plants, fruits, and vegetables as their Christianized compatriots. To give a list of these products is deemed unnecessary, as it would simply be a repetition of the names of products already specified as cultivated by the civilized tribes.

Of all the wild tribes, the Igorots, inhabiting the mountains of northern Luzon, are undoubtedly the most expert and industrious agriculturists. Their methods of cultivation, particularly those used in the cultivation of rice, and their irrigation systems have been described and illustrated in various official and other publications, and nothing can be said here in addition to what has been heretofore published in respect to them. For the benefit, however, of such readers as have not been previously informed regarding this remarkable people, the following extract is given from the official report, dated July 8, 1902, of Mr. Elmer D. Merrill, the botanist of the insular bureau of agriculture, on an overland trip made by him from Manila to Aparri during the months of May and June, 1902:

"*Rice.*—This is the staple crop and was cultivated in most localities visited on the trip. Methods of cultivation are very crude, and, with the exception of lands cultivated by the Igorots, but one crop is produced in a year, and that is grown during the rainy season. * * * In and about Quiañgan, Neuva Vizcaya, the Igorots, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than seen elsewhere. * * * During our stay in Quiañgan we had abundant opportunity to observe the methods of agriculture pursued by these people. Rice is the staple crop, but corn, potatoes, cabbage, camotes, beans, tomatoes, gourds, etc., are raised. Their system of agriculture is the most carefully observed in the island, the ground being carefully prepared and kept scrupulously free from weeds during the growing season.

"The Igorot uses no beast of burden, carabao and ponies being valued only as food. Pigs and chickens are raised, however. All the work is done by hand, the enormous system of rice paddies, extending for 2 or 3 miles up the steep mountain sides, on all sides of Quiañgan, being evidently the results of the work of generations of these people—their only agricultural implements being a bolo and a heavy wooden shovel, the blade of which is about 8 inches wide. All these rice paddies are irrigated by utilizing the mountain streams, two crops of rice being produced each year, the rice being of superior quality to that grown down in the valleys by the Ilocanos and Tagalogs. For guarding against the heavy rains of the wet season, they have an ingenious method of sluiceways to carry off the surplus water. Often the terrace banks will be 8 or 10 feet high, and many of the terraces are no more than 1 yard in width, the average size of the paddies being very small. They are very similar to those in the mountains of Ceylon, in the neighborhood of Kandy.

"The Igorots value seeds of new plants very highly, and would certainly make good use of any that might be sent them. They now raise potatoes and other vegetables in considerable quantities, which they offer for sale in the vari-

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ous market towns in the valleys. In the opinion of Governor Ney of Neuva Vizcaya, the one method that would be productive of the best results in bringing these people under control would be by the distribution of garden seeds among them. At present they are under little or no control, but with the exception of those tribes known as the "head-hunters," they lead peaceable lives so long as they are unmolested."

None of the other wild tribes approach the Igorots in point of industry and agricultural production. By all the methods and implements used are of the crudest, most primitive sort, and the extent and results of their labor are, as a rule, barely sufficient to supply the demands of a very limited home consumption of such products as they cultivate.

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[From Report of the Philippine Commission, 1903, vol. 2, pp. 668–676.]

PHILIPPINE AGRICULTURAL PRODUCTS, WITH BRIEF DESCRIPTIONS OF THE PLANTS, THEIR DISTRIBUTION AND USES, COMPILED FROM THE REPORTS OF CORRESPONDENTS OF THE BUREAU, BY F. LAMSON-SCRIBNER.

MANILA, *September 2, 1903.*

Achras sapota, Linn.—Chico (Sp. T.); Chicle (Eng.). A tree, 15 to 20 feet high, introduced from America, and cultivated in gardens throughout the archipelago. The fruit is edible and the sap yields valuable gum. It is highly appreciated.

Agaricus sp.—Payong ahas (T.); Agarico (Sp.); Agaric or Mushroom (Eng.). An umbrella-shaped cryptogamous plant, found in Luzon and the Visayan and Mindanao Islands. The entire plant is edible. Many species of Agaricus and genera related to them grow spontaneously throughout the archipelago.

Agathis loranthifolia, Salisb.—A lofty tree, from which the valuable resin called "Almaciga," dammar of commerce, is extracted. It is found on the mountains of southern Luzon and Panay Islands at elevations of from 500 to 1,000 meters. The resin is sold in Manila at $7 to $8 Mexican per picul.

Albizzia procera, Benth.—Adyangao. A tree furnishing a resin used as incense.

Albizzia saponaria, Blume.—Cogontoco. Yields resin for lighting purposes.

Aleurites saponaria, Blanco.—Baguilumban (T.); Balocanad (V.); Balucanang (Il.); Calumban. A native tree of Luzon and the Visayan Islands. The fruit is used in the manufacture of an ordinary kind of soap sold in Manila.

Aleurites triloba, Forst.—Capili, Lumbang (T.). A tree growing in Luzon and the southern islands. The fruit is used for making oil for illuminating purposes and a fertilizer, both of which are largely sold in Manila.

Allium cepa, Linn.—Lasona; Sibuyas (T.); Cebolla (Sp.); Onion (Eng.). A vegetable grown throughout Luzon and the Visayan Islands. The bulb and leaves are used in cookery.

Allium sativum, Linn.—Bawang (T.); Ajo (Sp.); Garlic (Eng.). An herb raised in small quantity throughout the archipelago. The leaves and bulb are used as a condiment.

Allium tricocum, Ait.—Cuchay, Cutsay (T.); Ganda (V.); Wild Leek (Eng.). A bulbous plant grown in the gardens of Luzon and other islands occasionally; spontaneously in Leyte. The leaves are used for condiment.

Amaranthus spinosus, Linn.—Bayang-bayang (Il.); Calites (V.); Coletes (T.); Colitis (T.); Cuanton, Harum (V.); Orayi. A native herb, 2 to 3 feet high, found on Luzon, the Visayan Islands, etc. The ash made from the plant is used for dyeing.

Anacardium occidentale, Linn.—Balubad (T.); Balubat (Pn.); Balurad (T.); Bologo (Il.); Casoy (T.); Cashew (Eng.). A small tree or tall shrub, raised in small quantities upon Luzon and other islands, having been introduced from tropical America. Fruit and seeds are edible; the former for dessert, and the latter to mix with chocolate after being roasted. Oil is obtained from the seeds.

Ananas sativus, Schult.—Piña (T. Sp.); Pineapple (Eng.). An herb raised throughout the archipelago for the flavor of its fruit, for local consumption.

Anisoptera thurifera, Blanco.—Lauan. A large tree that yields transparent, hard, and odorous resin of white-yellowish color, esteemed in commerce and used as incense, for the manufacture of varnishes, and for calking boats. Found throughout the archipelago.

Anisoptera oblonga, Dyer.—Sandana. A tree like Lauan, and grows in the southern part of Luzon, and the islands of Leyte and Mindanao. It yields a resin which is aromatic.

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Anona muricata, Linn.—Gayubano (Il.); Guanabano (P. Il.); Guayabano (T).; Guayabano (T. V.); Guanabena, Suirsaak, Susakka, Soursop (Eng.). A tree, 20 feet or more in height, found in Luzon and the Visayan Islands, introduced from America. The fruit is edible and good for preserves.

Anona reticulata, Linn.—Anonas (Sp. T.); Custard Apple (Eng.). An exotic tree from Mexico, 10 to 20 feet high, grown for local consumption on Luzon Island. The fruit is edible.

Anona squamosa, Linn.—Ates (T. Sp.); Atis (V.); Natis (P.); Sugar Apple, Sweetsop (Eng.). A small tree or shrub whose fruit is edible. It is highly prized and is found on Luzon and other islands, and used for local consumption.

Antidesma bunius, Spreng.—Bignay (P.); Bugnay (T.). A tree growing wild in Pampanga, Rizal, and other provinces. The fruit is edible, and is good for preserves.

Apium graveolens, Linn.—Quinchay, Quinsay (T.); Apio (Sp.); Celery (Eng.). A garden vegetable, growing throughout the archipelago, used locally. The leaf-stalk is used for dressing.

Apium petroselinum, Linn.—Perejil (Sp.); Parsley (Eng.). A garden vegetable cultivated for local consumption.

Arachis hypogæa, Linn.—Mani (T.); Cacahuete (Sp.); Ground Nut, Peanut (Eng.). A herb, cultivated in Luzon and other islands for forage. The seed is edible and is used for making oil, etc.

Areca catechu, Linn.—Bonga, Bunga (T.); Bonga (Sp.); Betel Nut (Eng.). A palm raised in all gardens throughout the archipelago. It grows to a height of about 30 feet. The nut is chewed by the natives. The leaves, stalks, and seeds are also utilized.

Artocarpus camansi, Blanco.—Camance, Camansi (V.); Camongsi, Dalangian, Dolongian; Pacac (Il..); Breadfruit (Eng.). A tree, 60 feet or more in height, growing in Luzon, Antique, Iloilo, and other islands, though rarely cultivated. The seed may be eaten raw or cooked. The flowers are good for sweatmeats.

Artocarpus incisa, Linn. f.—Antipolo, Rima (T.); Tipolo (P.); Breadfruit (Eng.). A tree growing to a height of about 60 feet, found throughout the archipelago. It is sometimes planted. The sap, bark, and fruit are utilized. The fruit is valued for preserves.

Artocarpus integrifolia, Linn. f.—Anangca (Il.); Langka, Nangka (T.); Jak Fruit (Eng.). A tree, 20 to 30 feet high, raised in gardens throughout the archipelago for local consumption. The fruit is eaten raw or cooked, and is good for preserves. The seeds when boiled or baked somewhat resemble chestnuts.

Artocarpus rima, Blanco.—Colo (V.); Ogob (B.); Rima (T.); Breadfruit (Eng.). A tree planted in the gardens of Luzon and other islands. When cooked the fruit is eaten, and is valued for making sweetmeats.

Asparagus officinalis, Linn.—Esparrago (Sp.); Asparagus (Eng.). An introduced garden vegetable raised in very small quantities in Cebu, Ilocos, and Manila. The young stalks are eaten when cooked.

Asplenium esculentum, Presl.—Paco (T.) A common fern growing spontaneously in Luzon and other islands. The young leaves are used as a vegetable.

Averrhoa bilimbi, Linn.—Camias (T.); Kamias (B. T.). A small tree raised in gardens on the island of Luzon. The fruit is used for dressing, sweetmeats, etc.

Averrhoa carambola, Linn.—Balimbing, Balinbin, Bilimbin (T.); Carambola, Coromandel Gooseberry (Eng.). A tree, about 25 feet high, cultivated in gardens of Luzon and other islands. The fruit is eaten raw and used for desserts, etc.

Bauhinia tomentosa, Linn.—Alibanban (T.). A small tree, 20 feet high, growing wild in Rizal, etc. The leaves yield an acid used as a substitute for vinegar.

Beta vulgaris, Linn.—Acelga (Sp.); Beet (Eng.). A vegetable found nearly throughout the archipelago, especially in Benguet; produced for local consumption. The leaves are used as a condiment, etc., and the fleshy roots are edible when cooked.

Bixa orellana, Linn.—Achiote (T.); Achote, Achuete (Sp.); Anatto, Annotta, Arnotto (Eng.). A small tree or shrub, about 10 feet in height, found throughout the archipelago, although not largely grown; introduced from tropical America. The fruit yields a coloring matter and is used in cookery, to color butter, etc.

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Brassica oleracea, Linn, var.—Repollo (Sp. T.); Cabbage (Eng.). A vegetable, raised to a large extent in Luzon Island, etc., for local use. The leaves are edible.

Brassica oleracea, Linn. var.—Coliflor (Sp.); Cauliflower (Eng.). A vegetable found in Pampanga and other provinces, but rarely raised. The bud is used for pickling.

Cæsalpinia sappan, Linn.—Sapang, Sibucao (T.); Palo-Brasil (Sp.). A tree, 14 feet or more high, growing in Luzon and Panay islands, which yields a red coloring material, sold largely in Manila markets, and exported to China and England.

Cajanus indicus, Spreng.—Cadios, Cadiws (V.); Caguios (T.). A vegetable found in Occidental Negros, Romblon, Antique, etc., though rarely planted.

Calophyllum inophyllum, D. C.—Bitanhol, Bitaog (T.); Dancalan, Dincalin, Tamaulan; Palo Maria (Sp.). A tree, growing wild upon the seashores throughout the archipelago. The seeds are used in making oil, and the bark yields a resin, both highly appreciated by the natives.

Cananda odorata, H. F. et T.—Alangilang (T.); Angilang (V.); Ilang-ilang (T. Sp.). A tree, 25 to 40 feet high, found throughout the archipelago. It is highly prized and grown for commerce, especially around Manila, Mindoro Island, etc., being valued for its flowers, which yield a fine perfume. The essence, called "Ilang-ilang," is exported to France, England, China, and Singapore.

Canarium album Blanco.—Pilani (T.); Pili (V.). A tree found in southern Luzon, and sometimes planted. The nut and sap are utilized, the latter being produced on a commercial scale.

Capparis mariana D. C.—Alcaparras (Sp.); Capers (Eng.). A shrub, 7 feet high, whose buds and fruits are used as condiments. It is found in Rizal Province, and is very scarce.

Capsicum sp.—Chile, Sile (T.); Pimiento (Sp.); Red Pepper (Eng.). An herb or shrub, many varieties of which are cultivated as garden vegetables throughout the archipelago. The leaves and fruit are used in cookery.

Capsicum minimum Roxb.—Chileng Bundoc (T.); Pasitis; Guindilla (Sp.); Red Pepper (Eng.). A shrub found upon Luzon Island. It is sometimes planted, and the fruit is used in cookery, etc.

Carica papaya Linn.—Capayas (V.); Papaya (T. Sp.); Pawpaw. A small tree, 20 feet high, of American origin, a garden product throughout the archipelago. The fruit is sweet and pleasant to the taste, and is used in making sauces, preserves, pickles, and desserts. There are two sexes, the flowers being diœcious.

Caryota onusta Blanco.—Caong, Cauong, Iroc (T.). A sort of sago is extracted from the fibrous stalk of this palm; and also tuba from an incision in the fruit.

Caryota urens Linn.—Banga or Pugahan (T.). A palm producing a starch or a species of sago of good quality.

Castanopsis philippinensis Vidal.—Talacatac; Wild Chestnut (Eng.). A tall tree found on Luzon and other islands, though not cultivated. The fruit is utilized.

Chenopodium ambrosioides Linn.—Alpasotes, Apasotis (T.). A native herb found wild throughout the archipelago. The leaves are used for seasoning food.

Cichorium endivia Linn.—Escarola (T. Sp.); Endibia (Sp.); Endive (Eng.). A garden vegetable raised for local comsumption on Luzon, etc. The leaves are used for salad.

Cinnamomum burmanni Blume.—Canela (T. Sp.); Cinnamon (Eng.). A small tree or shrub whose bark is used as a spice. It is found in the Philippines, especially in Mindanao, and formerly was cultivated.

Cissus acida Linn.—Caguindi (V.); Calitcalit, Cavilan (T.); Culutpamu (P.); Langingi, Lopo, Lopo-lopo, Lupo, Pacopol (V.). A native climbing herb, growing spontaneously on Visayan and Luzon islands. The young stems and leaves are edible and used as a substitute for vinegar.

Citrullus vulgaris Schrad.—Pakwan (T.); Sandia (Sp.); Watermelon (Eng.). An herbaceous vine, grown in small quantities throughout the entire archipelago. The fruit is used for dessert, the best being raised in Bulacan.

Citrus aurantium D. C.—Cagel, Cahil (T.); Large Lemon (Eng.). A fruit tree, growing on Luzon and other islands, whose fruit is highly esteemed. This tree furnishes a resin used for illuminating purposes.

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Citrus decumana Linn.—Lucban, Suha (T.); Naranja (Sp.); Orange (Eng.). A tree, 20 to 25 feet high, several varieties of which are planted in gardens throughout the islands of Luzon, Visayas, and Mindanao. The fruit is edible.

Citrus medica Linn.—Limon real (Sp.); Lemon (Eng.). A small tree, a garden product of Luzon and Panay, valued for its fruit.

Citrus medica Linn. var. *acida*.—Dalayap (T.); Limon (Sp.); Lemon (Eng.). A shrub grown in the gardens of Luzon Island, etc. The fruit is used for seasoning.

Citrus mitis Blanco.—Calamansi, Calamunding (T.); Limoncito (Sp.); Small Lemon (Eng.). A small tree, 10 to 15 feet high, found in nearly all gardens. The fruit and leaves are utilized for condiment and also in bathing as a perfume.

Citrus notissima Blanco.—Dayap (T.); Limon (Sp.); Lemon (Eng.). A shrub or very small tree, cultivated in the gardens of Luzon and other islands, and highly prized. The fruit is used in cookery, etc.

Citrus reticulata Blanco.—Naranjitas, Sintones (T. Sp.); Small Oranges (Eng.). A tree, growing upon Luzon and other islands. The fruit is highly prized, especially that from Laguna. It is grown commercially.

Citrus torosa Blanco.—Cabuyao (T. P.); Colobot (T.). Lemon tree, grown rarely in the island of Luzon for local use. The fruit is utilized in bathing and bleaching, and is edible, though not ordinarily used as an article of food.

Cocos nucifera Linn.—Niog (T.); Coco (Sp.); Cocoanut (Eng.). A palm, widely cultivated throughout the archipelago. Wine, vinegar, and many other products are manufactured from the sap, fruit, nuts, leaves, veins, etc. Copra, the principal product, is largely exported.

Coffea arabica Linn.—Cafe (T. Sp.); Cahaua (M.); Coffee (Eng.). A bush, 8 feet high, more or less, found throughout the Philippine Islands. It is valued for the seed (berry) which is a staple product, the best quality being grown in Batangas.

Colocasia antiquorum, Schott. var.—Dagmay (V.) Gabe, Gaby (T.); Gallang (B.); Gave (Il. Z.). A perennial herb, cultivated throughout the archipelago. The fleshy roots, leaves, and young shoots are used for food.

Colocasia esculenta, Schott.—Caladi (V.). A perennial herb, raised in small quantities on Panay Island. The leaves, young shoots, and starchy roots are edible.

Convolvulus repens, Willd.—Cancong (T.); Tancong, Tangcong (V.). An aquatic vine, growing wild throughout the archipelago. The stem is used in making salad, etc.

Corchorus oblitorius, Linn.—Saluyot (Il.). A shrub, found in Ilocos Norte; sometimes planted. The leaves are eaten when cooked.

Coriandrum sativum, Linn.—Cilantro, Comino (Sp.); Culantro, Ongsoy (T.). An herb, raised in small quantities as a garden vegetable on Luzon and other islands, whose leaves, stem, and seed are used for dressing.

Corypha umbraculifera, Linn.—Buri (T.). A lofty and beautiful palm, very well known in the Philippines for its usefulness, giving name to the island of Burias, where it is found abundantly. Sago of commerce is obtained from the soft interior part of the trunk. The fruit is edible, and tuba is obtained from an incision in the same. The tuba is made into wine and also a sort of sugar called pacascas, resembling maple sugar.

Crocus sativus, Linn.—Dilao (T.); Azafran (Sp.); Saffron Crocus (Eng.) A perennial herb sparingly grown in Luzon and other islands. The root is used for seasoning.

Cucumis melo, Linn. var.—Atimon, Catimon (V.); Melon (Sp.); Milon (T.); Melon (Eng.). An herbaceous vine raised for local consumption in Panay, Luzon, etc. The fruit is valued for dessert.

Cucumis sativus, Linn.—Calavaga (V.); Pepino (T. Sp.); Cucumber (Eng.). An herbaceous vine raised in small quantities throughout the Philippines. The fruit is used for making salad, etc.

Cucurbita lagenaria villosa, Linn.—Calabasang puti, Opo, Upo (T.); White Squash (Eng.). A tendril climbing plant, raised as a garden vegetable for local consumption throughout the archipelago. The fruit is eaten when cooked.

Cucurbita maxima, Duchesne.—Calabasang pula, Calabasang Bilog (T.); Red-squash (Eng.). A vine-like herb found throughout the archipelago, several varieties of which are grown for local use. The flowers and fruit are used for condiment, sweetmeat, etc.

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Cucurbita pepo, Linn. var. Aspera.—Condol (T. Sp.). An herbaceous vine, grown for local use in Luzon and other islands. The fruit is used for making sweetmeats, etc.

Daucus carota, Linn.—Carrot (Eng.); Zanahoria (Sp.). An herb cultivated for local use in Camarines, Cavite, Cagayan, etc. The root is edible.

Dillenia philippinensis, Rolf.—Catmon (T.). A tree the acid of which is used by the natives as a substitute for vinegar.

Dioscorea alata, Linn.—Ube (T.); Yam (Eng.). A climbing herb growing on Luzon and other islands, sometimes raised to a large extent. The tuber is used as an article of food.

Dioscorea divaricata, Blanco.—Baliacag (V.); Cobag; Dulian (Il.); Obat; Paquit; Chinese Potato, Yam, Cinnamon Vine (Eng.). A tall climbing plant with edible tubers. Found in northern Luzon and the Visayan Islands, and is sometimes cultivated.

Dioscorea papillaris, Linn.—Tongo, Tungo (T.). A vine found wild, but sometimes planted for its edible root or tuber.

Dioscorea pentaphylla, Linn.—Lima, Lima-lima, Nami-conot, Sap-ang. A vegetable growing in Luzon, Panay, Negros, Cebu, etc., though rarely cultivated. The tuberous root is edible.

Dioscorea sativa Linn. var.—Togui, Tugue, Tugueng pulo (T.) vine grown as a garden vegetable in Luzon and other islands. The tuberous root is edible.

Dioscorea triphylla, Pers.—Calut (P.); Carot (Il. V.); Corot (V.); Gayos (V.); Karot (Il.); Nami (T.). A vegetable found in Luzon and the Visayan Islands. The root is eaten when cooked. In times of scarcity it becomes a staple article of food among the mountaineers. The juice is also used.

Diospyros cunalon, D. C.—Cunalon. A tree the bark of which when dried and reduced to a powder produces a black coloring matter used by the natives for dyeing purposes.

Diospyros discolor, Willd.—Mabolo (T.); Talang (P.); Persimmon (Eng.) A native tree growing wild and also planted in gardens in Luzon and other islands. The fruit is edible.

Diospyros ebenaster, Retz.—Sapote, Zapote (T.); Persimmon (Eng.). A tree found in Cebu, Luzon, Mindanao, and Panay islands, though rarely planted. The fruit is edible.

Diospyros pilosanthera, Blanco.—Amaga (V.); Bolongaeta (T.); Dalongdong (V.); Persimmon (Eng.). A native tree whose fruit is edible, found in the Visayan Islands and Luzon.

Dipterocarpus grandiflorus, Blanco.—Apitong, Hapitong. A tall tree which yields excellent resin; sold in Manila market and exported; used for varnishing. Found in Luzon, Visayan, and Mindanao islands.

Dipterocarpus malaanonan, Blanco.—Malaanonang. A large tree producing an aromatic resin used for calking.

Dipterocarpus pilosus, Roxb.—Hagachac. A resinous big tree found in Mindanao, Visayan, and Luzon islands.

Dipterocarpus turbinatus, Gaertn.—Mayapis. A tall resin-yielding tree, found throughout the archipelago.

Dipterocarpus vernicifluus, Blanco.—Balao (T.); Malapaho (T. V.). A tree growing wild in parts of Luzon, Mindanao, and the Visayan Islands, yielding a resin used for varnishing, calking ships, and illuminating.

Dolichos cchinulatus, Blanco.—Quibal. An herbaceous vine produced in Batangas as a garden vegetable. The fruit is edible.

Dolichos sesquipedalis, Linn.—Camangeg (Il.); Camangian (P.); Otong; Sitao (T.); Long Yard Bean (Eng.). A twining plant, found throughout the archipelago and cultivated as a garden esculent. The green pods and dry beans are edible.

Dracontomelum Sp.—Alanihao (V.). A native tree, 90 feet or more in height, found in Romblon. The fruit is edible.

Eugenia jambolana, Lam.—Dujat (T.); Lombuy (V.); Lomboy (Sp.); Lumboy (T.); Jambolan or Jambolan Plum (Eng.). A tree found in both a wild and a cultivated state on Luzon and other islands. The fruit is used for dessert.

Eugenia jambos, Linn.—Tampoy (T.); Rose Apple, Jamrosade (Eng.). A tree raised as a garden product in Cebu, Luzon, and Panay. The fruit is edible and is used for making jelly.

Eugenia malaccensis, Linn.—Macopa, Macupa (T.); Yambo (P.); Poma-rosa Cuba); Otaheite Apple (Eng.). A tree about 30 feet high, a garden product of Luzon and other islands. The fruit is edible.

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Euphoria litchi, D. C.—Alipai (T.); Alopay, Alpay, Alupay, Alupe; Lechia (Sp.). A native tree of Luzon and other islands, yielding an edible fruit.

Ficus glomerata, Roxb.—Tibig na lalaqui; Cluster Fig. A shade tree growing by the streams of Luzon. The fruit is small and is much relished by children, and also by cattle. The tree is highly valued by the natives, for the reason that the roots yield drinking water.

Fœniculum vulgare, Gaertn.—Anis Estrellado (Sp.); Fennel (Eng.). A perennial plant, raised in very small quantities, but found throughout the archipelago. The seeds are used for dressing, sweetmeats, etc.

Garcinia mangostana, Linn.—Mangostan (T. Sp.); Mangosteen (Eng.). A tree growing on Jolo and Mindanao islands and known by the name of "King's Fruit." The fruit is sweet and has a very delicate flavor. It is much prized.

Hernandia peltata, Meisen.—Colong colong (T.). A native tree found in Luzon. Oil is made from the nut.

Heptapleurum caudatum, vid.—Limolimo. Yields a resin used for making varnish.

Homalanthus populifolius, R. Grah.—Balante. A tree whose bark when dried and reduced to a powder yields black coloring matter used by the natives.

Hopea plagata, vid.—Yacal. A lofty tree yielding transparent resin.

Indigofera tinctoria, Linn.—Ameri (B. C.); Mariana, Tagom, Tagum (V.); Tayom (T.); Tayung (P.); Afiil (Sp.); Indigo (Sp. Eng.). A small leguminous shrub about 5 feet in height, grown in Luzon and other islands. The entire plant, with the exception of the roots, furnishes a blue dyestuff known as indigo, which is much used in the industries. It is also raised to a considerable extent in Ilocos and Pangasinan, where the plant is known by the name of Indigo.

Ipomea batatas, Poir.—Camote, Camoti (T.); Sweet Potato (Eng.). A trailing vine, many varieties of which are largely cultivated throughout the archipelago and constitutes a staple product. The tuberous root and the leaves and shoots are the parts used.

Jasminum sambac, Linn.—Sampaguita. A plant with white, fragrant flowers, from which a highly prized essence is produced.

Jatropha curcas, Linn.—Casla (V.); Tava-tava, Tawatawa (Il.); Tuba (T.); Physic Nut or French Physic Nut (Eng.). A native shrub, about 8 feet high, found wild and planted for fences throughout Luzon and other islands. The fruit is used for making oil and is purgative.

Jatropha multifida, Linn.—Mana (T. Sp.). A shrub growing wild in Bulacan and Rizal, though sometimes planted. The fruit is used and is a purgative.

Justicia corrosiva, Linn.—Atay-atay (V.). A shrub planted in gardens for ornament; the leaves are used medicinally. It is found in the Visayan Islands.

Lablab cultratus, D. C.—Batao (T.); Bulay (P.). A vine raised in small quantities in Albay, Bulacan, Occidental Negros, Nueva Ecija, Rizal, Tarlac, and Zambales. The fruit is used as a vegetable.

Lactuca sativa, Linn.—Lechuga (Sp.); Lettuce (Eng.). A garden vegetable locally raised throughout the archipelago. The leaves are used for making salad.

Lansium domesticum, Linn.—Boboa (T.); Boocan; Bulahan (T.); Lanson (V.); Lanzones (Sp. T.). A small tree of beautiful appearance, 15 feet or more in height, found in Luzon and other islands. Cultivated to a large extent in Laguna Province, and is very highly esteemed. The fruit is eaten raw and prized as a dessert.

Leersia hexandra, Swartz.—Barit (T.); Zacate (Sp.). A grass which is cut by hand and sold green for feed for horses. An important industry in Manila.

Limonia trifoliata, Linn.—Limoncitos. A shrub, about 8 feet in height, growing spontaneously in Luzon and other islands. The fruit is esteemed for seasoning sweetmeats. Same as *Triphasia trifoliata*, D. C.

Lucuma mamosa, Gaertn.—Mamey (T.); Chico Mamey (Sp.); Marmalade plum (Eng.). A tall shrub growing in gardens in Laguna, valued for its fruit.

Luffa acutangulus, Roxb.—Patola (T.); Sponge Cucumber (Eng.). Cultivated as the following variety, for local consumption. The matted fibers of the fruit of this variety or the following one are being exported from Japan for lining hats and slippers.

Luffa ægyptiaca, Mill.—Patola (T.); Sponge Cucumber (Eng.). An annual tendril-climbing plant, raised as a garden vegetable throughout the archipelago. The green fruit is edible and is cooked like squash or served in soups and stews.

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Lycopersicum esculentum, Mill.—Camatis (T.); Tomate (Sp.); Tomato (Eng.). An herb of American origin, of which several varieties are raised throughout the archipelago. The fruit is utilized for dressing, sweetmeats, etc., and is eaten raw or cooked.

Mangifera altissima, Blanco.—Paho, Pajo (T.); Pao. A tree grown to a small extent in Luzon and other isalnds. The fruit is highly prized and is utilized for pickling, etc.

Mangifera indica, Linn.—Mampalam (J. M.); Manga (T.); Manga (Sp.): Mango (Eng.). A tree 30 to 50 feet in height, grown to a large extent throughout the entire archipelago. The fruit is harvested during spring and summer and is highly esteemed for dessert, jelly making, etc.

Manihot utilissima, Pohl.—Camoteng cahoy (T.); Adam's Needle, Cassava or Yucca (Eng.). A shrub, about 10 feet high, of American origin. The well-known tapioca is extracted from the starchy fecula of its roots. It is found both wild and cultivated in some provinces. The natives make a good sweetmeat of the roots, which finds a ready sale among them.

Maranta arundinacea, Linn.—Ararao (T.); Araro (V. P.); Bermuda Arrowroot (Eng.). An herb sometimes grown for local use in Luzon and other islands. The starchy roots are used for making arrowroot and sago.

Melastoma polyanthum, Blume.—Aguisip. A tree, from the bark of which a bright red coloring matter is extracted. It is used to dye hemp clothes.

Memecylon tinctorium, Pers.—Candong (Il.); Colis (T.); Saguinsin (V.). A tree growing spontaneously in Luzon and Visayan islands. The leaves are used for dyeing purposes.

Metroxylon rumphii, Mart.—Bagsang. A very common palm in the Visayan Islands; grows spontaneously in moist regions. The heart of the tree is reduced to a sort of flour, which is made into cakes or fritters and eaten with cocoanut milk; a wholesome and nutritious food.

Metroxylon silvestre, Mart.—Lumbia or Lumbay. A palm from which a sort of flour is obtained, which serves as food to the poorer classes in times of scarcity.

Mezoneurum glabrum, Desf.—Cabitcabag, Sagnit, Sapnit; Togabang (V.); Tugabang; Ugabang (V.). A woody vine found on Luzon and the Visayan islands, though not cultivated. The tender stems are cooked and used for making salad; the leaves are used medicinally.

Michelia champaca, Linn.—Champaca. A tree, 15 feet high, cultivated in gardens. A fine essence is extracted from its flowers.

Mimusops elengi, Linn.—Cabiqui (T.). A native tree, about 40 feet high, found on Luzon and other islands, whose fruit is edible and the flowers of which are very fragrant. It is sometimes planted in gardens.

Momordica balsamina, Linn.—Ampalaya, Ampalea (T.); Apale, Apalia (V.); Palaya (B.); Palla, Paria; Amargoso, Balsamina (Sp.); Balsam Apple (Eng.). An annual climbing herb, raised for local consumption in Luzon and other islands. The fruit and leaves are used as condiment for salad, etc.

Morinda tinctoria, Roxb.—Bancuro. A tree whose root produces a red coloring material, used for dyeing purposes.

Morinda umbellata, Linn.—Salicsican.—A tree from the roots of which the natives extract a red dyestuff.

Moringa oleifera, Lam.—Arongay (Il.); Arungay (P.); Balongay, Balungay (V.); Camalongay, Camalugay; Malungay (T.); Marungay (Il. V.); Horse-radish tree (Eng.). A native tree, about 15 to 25 feet high, found wild throughout almost the entire archipelago; sometimes planted for its fruit, leaves, shoots, and roots, which are used for various purposes.

Muntingia calabura, Linn.—Datiles, Ratiles (T.). A small tree, about 15 feet high, of American origin, growing spontaneously in Luzon Island. The fruit is edible, though seldom used.

Musa paradisiaca, Linn. var.—Saguing (T.); Platano (Sp.); Banana (Eng.). The native name for all kinds of bananas is "Saguing."

Musa paradisiaca, Blanco.—Bisco; Saba (T.); Saba Iloco; Platano (Sp.); Banana (Eng.). A variety of banana raised on a commercial scale throughout the archipelago.

M. paradisiaca lacatan, Blanco.—Lacatan (T.); Platano (Sp.); Banana (Eng.). A variety of banana grown in Luzon and other islands for its fruit, which is highly prized. It is claimed to be one of the best varieties on account of its superior flavor.

M. paradisica magna, Blanco.—Tondoc (T. V.); Tunduque (T.); Plantano (Sp.); Banana (Eng.). A variety of banana tree grown on a small scale in Luzon and other islands as a garden product. The large fruit is edible.

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M. paradisiaca maxima, Blanca.—Batavia (T.); Matavia (V.); Platano (Sp.); Banana (Eng.). Banana tree, found in Luzon and other islands and valued for its fruit.

M. paradisiaca suaveolens, Blanco.—Bungulan (T.); Platano (Sp.); Banana (Eng.). A variety of banana widely grown for its fruit.

M. pardisiaca ternatensis, Blanco.—Gloria (T.); Taranate (P.); Ternate (T.); Platano (Sp.); Banana (Eng.) A high tree-like herb very much appreciated and cultivated extensively for its valued fruit. Common in central Luzon.

Myristica Philippinensis, Lam.—Anis cahoy (T.); Nuez moscada (Sp.); Nutmeg (Eng.). A tree found growing naturally in Cavite, Laguna, and Cebu Island. The fruit or nut is used as a condiment.

Nicotiana tabacum, Linn.—Tabaco (Sp. T.); Tobacco (Eng.). An herb, 3 to 5 feet high, of American origin, growing in Luzon and the southern islands, the best being that grown in Isabela and Cagayan. Many varieties are largely produced and exported to foreign markets. The leaves are used for making cigars, cigarettes, etc.

Nipa fructicans, Wurmb.—Nipa (Sp. T.); Sasa (T.). A marsh plant, one of the most useful trees, growing throughout the archipelago. The sap or "tuba" is largely used for making wine and alcohol; the leaves for roof making, etc. The tuba when much fermented may be used as vinegar.

Ochrocarpus pentapetalus, Blanco.—Pamitlain, Pamitlatin. A tree growing in northwestern Luzon. The seeds yield an oil used for illuminating purposes.

Oryza sativa, Linn.—Humay; Paldy (T.); Arroz, Palay (Sp.); Rice, Paddy (Eng.). A cereal, hundreds of varieties of which are extensively cultivated throughout the archipelago. The grains especially are used for food and form a staple product.

Pachyrhizus angulatus, Rich.—Camas (B.); Hincamas (T.); Incamas (P. Pn.); Jincamas (T.); Kamas (Il.); Sincamas (T.); Ticamas (V.); Yam bean (Eng.). An herbaceous vine grown to a large extent in Luzon, etc. The tuber is eaten raw or cooked.

Parkia roxburghii, G. Don.—Cupang. A resin useful for illuminating is extracted from this plant.

Phalaris canariensis, Linn.—Alpiste (Sp.); Canary Grass, Canary Seed (Eng.). A grass grown rather for ornament in Abra, Ilocos Norte, and Ilocos Sur. The grain is used for feeding canary birds.

Phaseoulus, Sp.—Agayac (C.); Agayap (T. Pn.); Beans (Eng.). Beans found in Cagayan; raised in small quantities for local use.

Phaseolus lunatus, Linn.—Azabache, Zabache (T.); Frijoles (Sp.); Beans (Eng.). A vegetable found in Batangas and other places, though it is rarely cultivated. The fruit is used for food.

Phascolus lunatus inamœnus, Linn.—Patane (T.); Sieva or Civet Bean (Eng.). A climbing plant growing on Luzon and Panay islands, etc. The seeds are used as an article of food for local consumption.

Phaseolus mungo, Linn.—Balatong, Mungo (T.); Mongo (Sp.). An herb, 3 feet high, grown on a commercial scale throughout the archipelago. The seed constitutes an article of food and is a staple product.

Phaseolus vulgaris, D. C.—Butinga (T. P.); Habas (Sp. T.); Beans (Eng.). A vegetable raised for local consumption only in Batangas and Pampanga.

Phyllanthus distichus, Mull.—Bangquiling (T.); Iba (T. P.); Layohan; Paras (V.); Otaheite Gooseberry (Eng.). A tall shrub or small tree, about 20 feet in height, grown in gardens. The fruit is used for pickling and preserves and is sometimes eaten raw.

Pinus insularis, Endl.—Affords resin used for lighting. Found in Luzon.

Pinus mercusii, Jungh.—A tree producing a resin used by Igorots for illuminating purposes.

Piper betle, Linn.—Ikmo, Itmo (T.); Mam-in (P.); Mamon (V.); Samat (P.); Buyo (Sp.); Betle (Eng.). A climbing plant found in Luzon and other islands. It is raised to a large extent in Pasay, Rizal Province, and some other places. The leaves are used for chewing only, together with a piece of betel nut and a bit of lime.

Piper nigrum, Linn.—Malisa (P. Il.); Paminta, Pimenta (T.); Pimienta (Sp.); Black Pepper (Eng.). A shrub growing in Luzon and Panay islands, though rarely cultivated at present. Formerly extensively grown in Batangas. The fruit is used as a spice.

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Pisum sativum, Linn.—Chicharo (T. Sp.); Guisante (Sp.); Peas (Eng.). A tendril-climbing herb, grown as a garden vegetable in Batangas, Bulacan, etc.

Pithecolobium dulce, Benth.—Camachile (T.); Camanchile (T. Il.); Camansile (T.); Damortis (Il.). A tree, 25 to 40 feet in height, found on Luzon Island, having been introduced from America. It grows spontaneously and the fruit is edible. The bark is used for tanning purposes, and charcoal made from the wood is used in manufacturing gunpowder.

Portulaca oleracea, Linn.—Ansiman, Colasiman (T.); Olasiman, Verdolaga (Sp.); Purslane, Pusley (Eng.). A trailing weed found throughout the archipelago, but not cultivated. The stem and leaves are edible and are used as a salad.

Psidium guayava, Linn. var.—Bayabas, Tayabas (T.); Guayava (Sp.); Lemon guava (Eng.). A tree or shrub, 10 to 20 feet high, of American origin; found throughout the Philippine Islands. The fruit is valued for making jellies and preserves, and is used both locally and commercially.

Psophocarpus tetragonolobus, D. C.—Calamismis (T.); Camaluson (V); Kalamismis (T.); Pal-lam (Il.); Pallang, Seguidillas (T. Sp.). An herbaceous vine grown as a garden vegetable. It is found in Luzon and Panay islands, and grows wild in some places. The young pods are used for a condiment, salads, etc.

Punica granatum, Linn.—Dalima (J); Granada (Sp. T.); Pomegranate (Eng.). A shrub, about 10 feet high, found in Luzon, Jolo, etc. The fruit is edible, but the shrub is planted in gardens rather for ornament.

Raphanus sativus, Linn.—Labanos (T.); Rabano (Sp.); Radish (Eng.). A vegetable grown to a large extent throughout the archipelago. The root is edible.

Rhamnus Sp.—Cabatete (Il.); Cabatiti (Il. Pn.). A shrub, 9 to 12 feet high, found in Nueva Vizcaya. Very seldom used, though the leaves are edible.

Rhizophora mucronata, Lam.—Bakao, Bakawan (T.); Mangle (Sp.); Mangrove (Eng.). A small tree growing in mangrove swamps throughout the islands. The bark, fruit, etc., are utilized for dyeing and tanning purposes. The wood is much used as firewood.

Ricinus communis, Linn.—Lansina, Linancina; Tangantangan (T.); Palma Cristi, Ricino (Sp.); Caster Oil plant (Eng.). A shrub growing spontaneously nearly all over the islands of Luzon, Visayas, and Mindanao, forming dense jungles. The seeds yield an oil much prized in commerce.

Saccharum officinarum, Linn.—Tubo (T.); Caña dulce (Sp.); Sugar cane (Eng.). A tall grass, 8 to 15 feet high, several varieties of which are extensively cultivated throughout the archipelago, especially in Pampanga and Negros. Sugar made from the juice of the stalks forms a staple product, being largely exported.

Sandoricum indicum, Cav.—Santol. A tall tree grown in gardens throughout the archipelago. Valued for its fruit, which is utilized for dessert, preserves, etc.

Sesamum indicum, Linn.—Linga (T.); Ajonjoli (Sp.); Sesame, Beneseed, Gingelly, Til or Teel (Eng.). Two varieties of this important herb are raised in small quantities upon Luzon and other islands. The seeds are used for making oil and seasoning soups, pastries, confections, etc.

Sesbania grandiflora, Pers.—Catoday (Il.); Catuday (T. Il.); Caturay (P. Il.); Katuday (Il.). A native tree, 20 to 30 feet high, growing in Luzon. The flowers are used for salad, etc., and the resin medicinally.

Sesuvium portulacastrum, Linn.—Bilang bilang (V.); Carampalit (P.); Dampalit (T.); Tarumpalit. A succulent branching herb, found in Luzon and other islands. The stems and leaves are used as a vegetable, especially for pickling.

Setaria italica, Beauv.—Bicacao (V. T.); Bucacao (Il.); Mijo (Sp.); Millet (Eng.). A cereal found in Luzon, Cebu, etc., though rarely cultivated. The grains constitute an article of food.

Sinapis brassicata, Blanco.—Pechay (T.). An herb grown as a garden vegetable in Luzon and other islands. The leaves are used.

Sinapis juncea, Blanco.—Mostaza (Sp. T.); Mustard (Eng.). A vegetable growing in the gardens throughout the archipelago. The leaves and seeds are used for condiment, etc.

Solanum melongena, Linn. var.—Talong (T.); Berengena (Sp.); Egg-Plant (Eng.). An herb, 3 feet high, cultivated as a garden vegetable, for local consumption only, throughout the archipelago.

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Solanum tuberosum, Linn.—Batata (T.); Papa, Patata (Sp.); Potato, Irish Potato (Eng.). A vegetable of American origin, found in Luzon and other islands. It is raised to a considerable extent in Benguet. The tuberous root is used as an article of food.

Sorghum saccharatum, Moench.—Batad (V.); Batag; Sorghum (Eng.). A grass found in Iloilo, Masbate, Abra, etc., though rarely cultivated. The stem yields sugar; and the roots and seeds are also utilized. Alcohol can be obtained from this plant.

Tacca pinnatifida, Forst.—Canobong (V.); Panarien (Pt.); Parnarien (Il.); Tayobong (V.). A shrub, 6 feet or more high, cultivated in Antique, and very common in Ilocos and Zambales. The tuberous root is utilized in making a flour called "gaogao," sold in the Manila markets.

Tamarindus indica, Linn.—Samalagui, Sambag, Sambagui, Sambalagui (V.); Sampaloc (T.); Tamarindo (Sp.); Tamarind (Eng.) A tall tree, about 30 feet or more in height, grown to a limited extent in Luzon, the Visayan Islands, etc., and valued for its fruit, the meat of which is edible and serves for making preserves, syrup, dressing, etc.

Terminalia catappa, Linn.—Dalisay, Talisay; Almond (Eng.). A tree, 30 to 40 feet high, growing spontaneously throughout the archipelago. The seeds are edible and are known as native almonds.

Theobroma cacao, Linn.—Cacao (Sp. T.); Cocoa (Eng.). A shrub or small tree of great importance found throughout the archipelago, introduced from America in the sixteenth century. It is grown to a large extent and the fruit is edible. The seeds are used for making chocolate. Large quantities of cacao of excellent quality are produced in southern Mindanao and district of Davao.

Triphasia trifoliata, D. C.—Limon suti. A shrub, growing spontaneously in Jolo, Mindanao, Luzon, and Panay. The fruit is used for dressing, etc.

Triticum vulgare, Willd.—Trigo (Sp.); Wheat (Eng.). A cereal grown in Batangas, Cagayan, Cavite, and Ilocos Norte, though rarely planted at present. The grain is used for making flour, which is made into bread.

Vatica mangachapuy, Blanco.—A tree of medium size, which yields resin.

Vitis Sp.—Uvas (Sp.); Grape (Eng.). A vine raised or planted in gardens in Albay, Ilocos Norte, etc., but rather for ornament than for fruit. The fruit is, however, used.

Zea mays, Linn.—Mais (T.); Maiz (Sp.); Corn (Eng.). A cereal introduced from America, many varieties of which are cultivated throughout the archipelago. Theg rains are utilized for food, being a staple product.

Zingiber officinale, Linn.—Baseng (Il.); Loyal (M.); Luya, Luy-a; Pangas (M.); Jengibre (Sp.); Ginger (Eng.). A vegetable grown in Luzon and other islands for local consumption. The tuber or root is the part used for dressing or as a spice.

Zizyphus jujuba Lam.—Manzanitas (Sp. T.). A tree, planted in gardens in Cavite, Ilocos Norte, etc., yielding an edible fruit.

NOTE.—B., Bikol; C., Cagayan; Il., Ilocano; J., Jolo; M., Mindanao; P., Pampanga; Pn., Pangasinan; T., Tagalog; V., Visayan; Z., Zambales.

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(From Report of the Philippine Commission, 1903, vol. 2, pp. 677–697.)

AGRICULTURAL CONDITIONS RELATIVE TO VALUE OF LANDS, WAGES OF FARM LABORERS, PRINCIPAL CROPS, ETC., IN THE PROVINCES.

Many letters have been received by the bureau requesting information as to the availability and prices of lands, the wages of farm laborers, and the principal crops in the various provinces, presumably with the view of making investments. In order to answer our correspondents intelligently, a circular letter of inquiry was addressed to officials in the provinces covering the points in question, and, as there appears to be a general demand for information along these lines, the replies so far received are here presented in full.

PROVINCIAL GOVERNMENT OF PANGASINAN.

LINGAYEN, *July 14, 1903.*

SIR: In reply to your circular letter of July 10, 1903, I have the honor to inform you as per your notations.

First. Relative to private lands which might be obtained by purchase and the price per hectare.

In answering this question, it will only be necessary to consider cultivated land as divided into two general classes—that is, rice land and sugar land. Rice land embraces all or the major portion of the lowlands of the provinces, or land that may be easily irrigated, or is subject to inundation to a greater or less degree at certain seasons of the year. The better quality of this land may be had at prices ranging from $150 to $200 Mexican per hectare. The sugar land will embrace all land not subject to inundation, although much of it is susceptible to easy irrigation. This class of land may be purchased at from 100 to 150 pesos per hectare. Uncultivated land, whether high or low, that will bear the distinction of arable land, may be bought for 25 to 50 pesos per hectare. I will state, in this connection, that prices in general for land here seem to be based rather more upon the financial necessity of the owner than upon the real natural value of the land itself. However, the price given will, I think, be found to represent the average prevailing at this time.

Second. What are the wages usually paid ordinary farm laborers?

The farm laborer does not receive a wage, in the usual sense as we use it. All agricultural work is done on the share-and-share system. The large land owner sometimes advances money to his laborers, but rather more frequently his advances are confined to the food required by the laborer and his family. When the crops are harvested these advances are returned from the portion of the yield belonging to the laborer, which constitutes his hire. I am told that if one were to attempt to hire labor of this class it would be necessary to pay 50 cents Mexican per day and food in addition.

Third. What are the principal money crops, and could these crops be advantageously increased?

The principal money crops of this province are rice, sugar, nipa, corn, indigo, cocoa, and tobacco. Under certain conditions these crops could be enormously increased.

Your fourth question, "Can you give an estimate of the amount of income derived from the crops at the present time?" is rather a difficult one to answer. There are no statistical data to base an estimate upon, but from the best information obtainable I would say that the products of the soil in this province are yielding at this time an annual income of from 8,000,000 to 10,000,000 pesos.

Fifth. What obstacles, if any, must be overcome in order to secure larger crops or greater agricultural activity?

This question is a broad one, and I am afraid I can do it but poor justice. Larger crops, in the initial sense, could be secured if there were more labor

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and animals at the disposal of the planter, and naturally greater agricultural activity would follow; but if the best results are to be obtained and land already under cultivation brought to a higher state of efficiency methods must be changed, and here is where the deepest water and the most obstinate opposition will be encountered. Just now the most depressing local conditions are the scarcity of animals and the abundance of locusts, and, perhaps, after all, if these obstacles were removed, conditions might be so improved as to bring the solution of the greater problem at least within the bounds of a possibility.

Respectfully,

C. F. VANCE, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PANGASINAN.

LINGAYEN, *August 14, 1903.*

SIR: In reply to your letter of the 10th ultimo, I have the honor to send you the following information:

First. It is believed that private lands can be purchased here at the price of $50 to $100 Mexican per hectare.

Second. Laborers' wages are 50 cents a day.

Third. The most profitable crops in this province are rice in the first place, and tobacco, sugar cane, and cocoanuts in the second, all of which could be advantageously increased.

Fourth. It is estimated that rice is grown at a profit of 15 per cent, and that 15 per cent to 20 per cent is obtained from the production of other crops.

Fifth. At present, the greatest obstacle to be overcome is the lack of draft animals and the swarms of grasshoppers.

The above information has not been furnished earlier on account of having to await reports from the several towns of this province.

Respectfully,

M. FAVILA, *Provincial Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ALBAY.

ALBAY, *July 22, 1903.*

SIR: I am in receipt of your circular letter of the 10th instant, requesting certain information and, in reply, have the honor to state the following in answer to your questions:

First. Fully 80 per cent of the male adults of this province are landowners. This land can be bought by purchase, the price varying from $5 to $200 Mexican per hectare.

Second. The average wages paid for day labor varies according to the class of labor; the ordinary day laborer receives 1 peso per day; carpenters, $2.50; stone masons, $2; hemp workers are compensated by receiving one-half of the amount of hemp fiber they produce per day, this varying from 4 to 8 pesos per day—that being the portion due to the laborer.

Third. The principal crops of this province are hemp, copra, and rice.

Fourth. During the past year the province produced in the neighborhood of $12,000,000 Mexican worth of hemp; copra, in the neighborhood of $1,000,000. Rice—this crop was very short, owing to the lack of carabao. The present year, however, at least one-third of the sementeras (rice lands) of the province have been put under cultivation.

Fifth. The greatest obstacle in this province at present to the increasing of the present output of its products is the lack of labor, there being many thousand acres more hemp under cultivation than there are laborers to extract the fiber. Labor and transportation are the two great drawbacks in the province.

Trusting the above is the information desired, I remain,

Respectfully,

A. U. BETTS, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

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PROVINCIAL GOVERNMENT OF ANTIQUE.

SAN JOSE, *July 27, 1903.*

SIR: In reply to your letter dated July 10, 1903, I have the honor to give you the following information regarding Antique Province:

First. Private lands can be obtained in almost any quantity at from $50 to $150 Mexican per hectare.

Second. Ordinary farm laborers are generally paid from 20 to 30 cents Mexican per day.

Third. The principal money crops in this province are rice, sugar cane, and some hemp.

Fourth. I am unable to give you an estimate of the amount of income derived from these crops, but will state that the profits are very good.

Fifth. The only obstacles that I know of to be overcome in order to secure larger crops are the scarcity of work animals and the lack of improved farm implements. The soil seems to be especially adapted to the culture of rice and sugar cane, though stock raising would be a profitable business on account of the vast grazing lands throughout the province.

Respectfully,

B. F. REAMY, *Supervisor-Treasurer.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BATAAN.

BALANGA, *July 28, 1903.*

SIR: In reply to your letter of July 10, I have the honor to reply as follows to to the various questions:

First. Yes; from $100 to $280 local currency per hectare. Many are anxious to sell at this time on account of the land tax, locusts, and other causes.

Second. Fifty cents local currency per day, without board; with board, 40 cents local currency.

Third. Sugar and rice. Improperly called "money crops," as not enough is produced for home consumption. In former times, however, large quantities of sugar were sold.

Fourth. Practically none sold outside of the province.

Fifth. Natives claim that there is a lack of carabao. However, except in one or two towns of the province, there are plenty of animals for present needs. I have never had any trouble in getting carabao carts for road work at from $1 to $1.50 local currency per day. In my opinion, there is a great need of capital in order to revive the agricultural interests. Many who would work have no capital for the necessary outlay to plant and gather the crop.

The general use of new seeds would materially aid those who plant at present corn, sugar cane, and new rice.

Respectfully,

C. D. WOOD, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BENGUET.

BAGUIO, *August 3, 1903.*

SIR: In answer to your letter of July 10, 1903, I have the honor to make the following replies:

First. There are no private lands in this province worth mentioning which could be obtained by purchase; Benguet is almost entirely government land.

Second. There are no farm laborers; every man cultivates his own land, with the aid of his servants, if he happens to have any; they could hardly be called farm laborers.

Third. The principal money crops of this province consist of only coffee and potatoes.

Fourth. Ten thousand dollars Mexican is a fair estimate of the income derived from these crops at the present time.

Fifth. The only obstacle to overcome in order to secure larger crops is transportation.

Respectfully,

WM. F. PACK, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

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PROVINCIAL GOVERNMENT OF BOHOL.

TAGBILARAN, *July 29, 1903.*

SIR: In answer to your communication of July 10, I have the honor to report:

First. That there are private lands in this province which can be bought at about $15 Mexican per hectare.

Second. The wages paid farm laborers are 10 cents to 20 cents Mexican per day, with board.

Third. That the principal crops at present are abaca and copra, and that rice, cotton, coffee, cocoa, sugar, and tobacco could be raised in addition.

Fourth. That I can not give an estimate of the income derived from the various crops.

Fifth. That the difficulties to farming at present are the billions of locusts, which breed undisturbed in the grassy plains of the northern part of the province, lack of draft animals, lack of good irrigation system, lack of good roads connecting the interior with the coast, and the very antiquated methods of farming in the province.

Respectfully, JACOB C. MULDER, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ILOILO.

ILOILO, *July 16, 1903.*

SIR: In reply to your circular of July 10 would say:

First. There are plenty of private lands in this province that can be bought at the present date. The price of the same will be according to the class of land. If it is first-class sugar land or first-class rice land, it will sell on an average of $40 gold per hectare between the natives; but if a person from the outside tries to buy the price is generally higher. The people class the land as to number of times it has to be plowed and its location to river and elevation. That which is near a river, where the river can overflow its banks and leave the rich deposit on the land, is the first class. Then that which has to be plowed a number of times are the other classes. Finally, the last is that which they call grazing land, and they value it at about $5 gold per hectare. Prices between the first and last classes vary from the first price given to the last.

Second. As far as I know, the wages paid on the haciendas here are $1 local currency per week and a place to live and two rations a day. That is the general rate, but there are some who pay less.

Third. The principal crops here are sugar, rice, and tobacco, and a little hemp. They could be advantageously increased a great deal.

Fourth. I can not give you any information regarding this question, as I would be very greatly in error, and would not make a statement.

Fifth. The obstacles to be overcome to secure larger crops or greater agricultural activity are many. The native must do more work than he does. He must be taught the difference between plowing with a stick and plowing with a plow, which will uproot the weeds and give the sun a chance to kill them. Draft animals must be kept in the province, instead of being shipped out all the time. Brigandage retards the cultivation of the country, as a man must live in the town and go to his little ranch every day and return where he can have some degree of safety. From my observations the natives have very little idea of the cultivation of the products. Knowing how to cultivate them and using farming implements of the right kind, the crops could be doubled easily.

I should judge that at least 50 per cent of the cultivable ground of this province is idle, this from shortage of draft animals.

Respectfully,

E. S. WHEELER, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

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PROVINCIAL GOVERNMENT OF ISABELA.

ILAGAN, *August 18, 1903.*

SIR: I have the honor to reply as follows to your letter of July 10, 1903, in reference to lands, crops, etc., in this province, answering the questions in the order in which you present them:

First. There are large lots of private lands in Isabela which may be bought at from $20 to $40 United States currency per hectare, depending upon location; i. e., whether overflow land, on which tobacco best grows, or land higher up, suited to corn, etc. Titles are very unsatisfactory, however, owing to the former system of registration.

Second. There is scarcely such a thing as hired farm labor known in the province. Each family owns a small tract of ground and raises its crop of tobacco and maize or works the lands of individuals or companies on shares. The province pays 50 cents Mexican per day at present for ordinary labor, but this is for a better class of men than the average, and the price is considered high.

Third. The only money crop is tobacco. Every family in the province raises it, and the trouble about increasing the output is shortage of labor. Vast tracts of valuable private lands are lying idle for want of tenants, to say nothing of the state lands that could be taken up were they needed. It is safe to say that Isabella Province could support five times the present population without difficulty.

Fourth. The approximate value of the tobacco crop of Isabela is $1,000,000 local currency per year.

Fifth. The crying needs of the Cagayan Valley are labor and transportation. It is believed that with transportation labor would rush in, and the early construction of a railroad from Manila to Aparri would develop one of the most valuable sections of the Philippines.

Respectfully,

N. B. STEWART, *Supervisor-Treasurer.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF LAGUNA.

SANTA CRUZ, *August 18, 1903.*

SIR: I have the pleasure to reply to your official letter, dated the 10th ultimo, as follows:

First. There are plenty of agricultural lands in this province, but they can not be purchased, for the owners prefer to have their money invested in land in preference to having it invested where the gain is doubtful and where it is not so safe. Most of the people of Laguna are landowners and are interested in agriculture.

Second. Laborers are paid in the following manner: On cocoanut plantations it is customary for the laborers to receive one-fifth of the crop in payment of their work. In the case of sugar cane, abaca, rice, and others of minor importance, laborers receive only one-fourth of the crop; but as a rule his share amounts to one-fifth of the yield.

Third. The principal crops of this province are as follows: Cocoanuts, copra, sugar cane, rice, abaca, and others.

The yield of sugar cane and rice, which are the most valuable agricultural products of this province, has not been so large during these last three years as formerly, on account of the lack of animals, this preventing a great number of lands from being cultivated. The cocoanut and abaca plantations have not suffered so much, for they can be planted and kept under cultivation without animals.

Fourth. The yield of the crops can not be ascertained, or even estimated.

Fifth. Lack of animals and an abundance of grasshoppers, which play havoc with the plantations, are the principal obstacles to be overcome. When the farmers have acquired possession of more animals, and grasshoppers have disappeared through the cooperation of the people and local authorities, the agricultural conditions of this province will undoubtedly improve rapidly.

Respectfully,

JUAN CAILLÉS, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

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PROVINCIAL GOVERNMENT OF LAGUNA.

SANTA CRUZ, *July 16, 1903.*

SIR: In answer to your circular of July 10, 1903, I have the honor to reply as follows:

First. I know of no private lands for sale in this province. Have heard rumors of lands, which are not now under cultivation because of the lack of carabao, being on the market for sale, but can give no information as to prices.

Second. I am informed that laborers receive about 50 cents Mexican per day. Where they do work by contract, it is possible to earn $1 Mexican per day.

Third. The principal crops of this province are cocoanuts, hemp, rice, and sugar. Only a small part of the hemp, rice, and sugar lands are now under cultivation, the last two because of the want of farm animals.

Fourth. No; I understand that the profit for cocoanut trees will average about 1 peso per year.

Fifth. Supply of work animals must be increased. The people must be induced to settle and develop the hill country.

Respectfully, DAVID A. SHERFEY, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF LEYTE.

TACLOBAN, *August 8, 1903.*

SIR: In reply to the questions contained in your communication of July 10, regarding crops and agricultural lands in the province of Leyte, I have the honor to report as follows:

First. There are private lands which can be purchased, but it is extremely difficult to get at the prices which may be asked. The people have very little idea of the value of real property, and the prices are a matter of sentiment and not in any way based on the producing power of the land.

In talking with the presidente of Abuyog recently he stated that the price for tracts capable of producing 300 or 400 pesos' worth of hemp per year was 100 pesos, but that it was not "costumbre" in his town to sell land; that is, the land originally cost 100 pesos, and that had been the price ever since, should any one ask, but no one cared to sell.

The prices used by the tax boards for estimating values for the land-tax assessments varied from 2 cents local currency per square braza for uncultivated land to 5 and 10 cents for cultivated, according to location.

Second. Most of the labor (farm) is performed on the cooperative plan, the large landholders renting their property in small holdings for a certain percentage of the produce. A store is often run in connection, at which the tenant secures all his supplies on trust until such time as the crop matures. The owner is then paid his share of the crop and generally purchases the rest.

On the provincial roads the men are paid 50 cents Mexican per day for laborers, and 1 peso per day for section bosses, but they are very hard to secure at any price. At Tacloban the day laborers secure 1 peso per day, when they can be induced to labor at all.

In the hemp districts it is extremely difficult to get day laborers, as they prefer to go into the hemp fields and work on shares. At this work a man can earn enough in one day to keep himself and family for a week or more, and is, consequently, under no obligation to work the remaining time, and does not.

Third. The principal crops are hemp, copra, and some tobacco, and all of these could be much increased.

Fourth. The annual money value of the hemp crop is estimated at from $8,000,000 to $10,000,000 local currency and the copra at about $500,000 Mexican. The tobacco is almost entirely used for home consumption.

Fifth. Lack of roads from the coast to the interior, over which the produce can be marketed, offer considerable obstacle to the increase in quantity of the crops, but the main drawback is the lack of energy on the part of the inhabitants themselves. Not much is done in the way of cultivation, and the present output is mostly made up of things that happen, and is not brought about through any assistance rendered by the people to a kind Providence.

Respectfully,

S. B. PATTERSON, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

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PROVINCIAL GOVERNMENT OF MINDORO.

CALAPAN, *July 17, 1903.*

SIR: Replying to your circular letter of July 10, I have the honor to submit the following:

First. Yes. The highlands, without timber, formerly sold for $2 Mexican; the lowlands at $25. Lands planted to cocoanuts, cocoa, coffee, or hemp, sold at prices agreed upon for each plant or tree.

Second. At present laborers furnishing their own tools and animals are paid 50 cents Mexican per day, with two meals. They were formerly paid half these wages.

Third. The principal money crops of the province are cocoanuts, hemp, and palay, which, with cocoa, coffee, corn, and other cereals, could be considerably increased.

Fourth. It is impossible to make an estimate at this time as a result of the loss of animals and failure of crops from drought and locusts.

Fifth. The only obstacle in the advancement of Mindoro is the lack of labor. It is my opinion, in which I am supported by the influential natives of the province, that the importation of Chinese is a necessity. The entire province might properly be called virgin soil.

Respectfully,

R. J. OFFLEY,
Captain, Thirtieth U. S. Infantry, Governor.

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF NUEVA ECIJA.

SAN ISIDRO, *July 25, 1903.*

SIR: I have the honor to reply to your communication of the 10th instant as follows:

First. According to results of the census there are private lands in "haciendas," 148,626 hectares, 89 areas, 16 centiareas; in "solares" (gardens), not haciendas, 2,821 hectares. Official taxation per hectare is assessed according to the class of land, to wit:

	U. S. currency.
First	$25.00
Second	20.00
Third	15.00
Fourth	10.00
Fifth	5.00

The "solares" are not appraised per hectare, but according to the estimates furnished by the respective owners.

Second. In this province it is not customary to pay day wages to the field laborers; but 40 cents Mexican is, approximately estimated, a laborer's daily wage.

Third. The principal fount of wealth in this province is agriculture, chiefly that relating to the cultivation of palay, which undoubtedly must and can undergo greater development. It is at present in a state of great depression.

Fourth. For the present no estimate can be made of probable crops, for the reason that the majority of the farmers have been unable to plant seed beds even, owing to the backwardness of the rains. In 1902 the crop results were as follows:

Rice	cavans	502,906
Corn	ears	20,422,099
Tobacco	bales	5,741
Sugar	piloncs	[a] 221

Respecting crops of previous years—previous to 1902—the losses this year were 75 per cent in rice, 80 per cent in corn, 70 per cent in tobacco, and 95 per cent in sugar.

Fifth. Besides the need of opportune rainfall, owing to a lack of irrigated lands in this province, and the complete extermination of the locusts, there is also a great shortage in working animals.

[a] 1 pilon equals about 344 pounds.

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There are at present 14,821 carabao, 25 per cent of which are useless for work. Before the war and the epizooty there were 35,000 useful carabao. We are, therefore, in need of 23,879 carabao to place this province in the same condition in which it was before the war and the appearance of epizooty. Before the war—that is, in the years 1890 to 1895—our crops amounted to:

Rice	cavans	2,011,623
Corn	ears	102,110,495
Tobacco	bales	19,136
Sugar	pilones	4,419

During the period of the tobacco monopoly this province yielded 200,000 bales in 1862, and in 1875 the crop was 70,800 bales.

Respectfully,

EPIFANIO DE LOS SANTOS CRISTOBAL, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PAMPANGA.

BACOLOR, *August 14, 1903.*

SIR: In reply to your communication of the 10th ultimo, I have the honor to inform you that I have consulted all the presidentes in this province by letter in regard to your queries; but 10 have answered. The following is a résumé of information thus derived:

Private lands can be purchased in this province in the municipalities of Bacolor, Lubao, San Miguel, Candaba, Mexico, and San Fernando at from 5 to 250 pesos per hectare, according to the class and location.

Most of the laborers are tenants and work the fields on shares, receiving from one-quarter to three-fifths of the crop. Others are paid by the day, and, according to the presidentes' reports, receive from one-half to 1½ pesos per day. I think this price is excessive. I pay my road laborers 50 cents Mexican per day.

The presidentes gave me no information in regard to crops. From observation I find that sugar and rice predominate. Also small amounts of corn and indigo are cultivated.

The presidentes can give me no estimate of the values of crops.

Locusts, lack of carabao, dryness, inundations, lack of money, imperfect implements, lack of laborers, lack of irrigation, lack of regulations between proprietors and tenants, and lack of good methods of transportation seem, from the presidentes' reports, to be the chief impediments to procuring larger crops.

Respectfully,

N. P. CREAGER, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF PARAGUA.

CUYO, *July 30, 1903.*

SIR: I have the honor to acknowledge receipt of your circular letter of July 10, 1903.

First. I do not know of any private lands in the province for sale where the supposed owners can give a good and sufficient title for the same. One can buy the native's right to a piece of land, running the risk of ever obtaining a title for the land, for about $10 Mexican per hectare.

Second. The price of labor varies greatly, depending upon circumstances. For example, a native will work for another native for less than for an American, because he does not have to work as hard. Labor can be obtained for from $3 to $5 Mexican per month, if they are not to be taken away from their homes or families. If they are to be taken away from the particular island or municipality in which they live, sometimes almost any price is necessary—at times as much as $40 Mexican per month is necessary.

Third. The principal money crops are rice, copra, tobacco, and hemp. Many raise cattle. All of these could be largely increased if the public lands were surveyed and opened to settlement or purchase by people who will put money into land when they can obtain a good title to enough land to justify establishing a hacienda. People with money and brains are not going to put it into a 16-hectare farm; neither will they put in any improved machinery to cut 10,000 cubic feet of timber.

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Fourth. Copra is about the only product except cattle where any more is produced than is used in the province. The harvest is excellent for all the crops, but there is no one here to go into it on a large scale.

Fifth. The only obstacles to overcome are labor and title to land; with these will come money and brains to use the land and labor.

Respectfully,

WM. A. PHILLIPS, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF RIZAL.

PASIG, *July 18, 1903.*

SIR: Replying to your official letter of the 10th instant, I have the honor to advise you as follows:

First. All of the land in this province is under cultivation; nevertheless some land could be bought, especially if a good price were paid for it. A balita of workable land ordinarily costs 100 pesos. Balita is the unit of measurement here, and represents some 2,000 square meters, or approximately 20 ares. The price per hectare is some 500 pesos, more or less.

Second. One to 1½ pesos is the daily wage of farm laborers, although it is not customary to pay them in money, the usual proceeding being that the laborer receives a share in the crop (or the products of the crop) from the owner or lessee of the land.

Third. There are two important crops in this province, rice and sugar. There are also corn, mangoes, sweet potatoes, bananas, and other tubers no less necessities of life for the planter. All of these could be increased advantageously if there were sufficient carabao in the province. An adequate supply of these animals is the only hope of salvation for the suffering planter and would enable him to look forward with confidence to the future for his subsistence.

Fourth. Thirteen thousand and thirty-seven hectares 68 square decameters and 97 square meters of land yielded last year 3,154,451 cavans of rice throughout the province; 1,682 hectares 43 square decameters and 33 square meters produced in the same year 57,752,005 canes of sugar; 409 hectares 9 square decameters and 75 square meters yielded for that period 615,585 ears of corn, besides other products, such as bamboo, tomatoes, bananas, melons, watermelons, small cucumbers, ilang-ilang, cocoanuts, betel leaves, plums, sweet potatoes, tobacco in the leaf, mangoes, tamarinds, oranges, zacate, pineapples, guavas, hicamas, rosemary, mulberries, abaca, peanuts, gabes, chicos, mabola, eggplant, carambola, casuy (a gum), dates, onions, coffee, cacao, nanca, bonga, santol, lomboy, rubber, papaw, radishes, and others.

Fifth. The obstacles which it seems to me should be overcome are, first, the shortage in carabao; then the locusts, which destroy plantings; then the small worms, which resemble the phylloxera genus and destroy sowings of rice, sugar cane, corn, and others.

Respectfully,

A. DANCÉL, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF SAMAR.

CATBALOGAN, *July 25, 1903.*

SIR: Referring to your letter of the 10th instant, I have the honor to answer questions asked, as follows:

First. There seems to be no demand nor market for agricultural lands in this province at the present time.

Second. Ordinary farm laborers receive from 5 to 15 pesos per month.

Third. The principal money crop of the island is hemp. Others that could be mentioned are cocoanuts and their productions, such as copra; a limited amount of sugar, and an abundance of fruits, principally bananas, mangoes, etc.

Fourth. Can form no estimate of income derived from these crops.

Fifth. Obstacles to be overcome. The war has paralyzed all industries, and an agricultural bank, such as has been proposed, that would loan money on

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real estate security and thus enable the people to again make a start would, I believe, prove of great help.

In addition to what has been stated in answer to No. 4, I would state that all of these crops can be materially increased, the production of the province being at a minimum and agriculture practically at a standstill.

Respectfully,

PEDRO A. CASANOVA, *Treasurer.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF SURIGAO.

SURIGAO, *July 23, 1903.*

SIR: In reply to your communication of the 10th instant, I beg to state the following:

First. There are private lands in this province that can be bought at the rate of 50 pesos per hectare.

Second. Ordinary laborers get half a peso per day.

Third. The principal crops which can be raised to a great advantage are manila hemp, copra, and rice.

Fourth. The following are at the present time the estimated yields, viz, 85,000 piculs manila hemp, 17,000 piculs copra, and 20,000 cavans of rice.

Fifth. In order to insure success in getting better results there should be undertaken the improvement of the present system of preparing and cultivating the land, and harvesting according to modern methods of culture or by means of improved agricultural implements.

Respectfully,

PRUDENCIO GARCIA, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF TAYABAS.

LUCENA, *July 28, 1903.*

SIR: In reply to your favor of the 10th instant, I have the honor to state that, so far as I can learn, there are no private lands for sale on this coast, but that on the Pacific coast lands in limited quantities may be purchased at an average price of $100 Mexican per hectare.

The average price for farm laborers on this coast is 50 cents Mexican per day and subsistence, or they are paid by the amount of work done. On the Pacific coast labor is obtainable only on the share system.

The principal money crops in the province are copra and hemp. As there is always a demand for these products, I see no reason why they could not be advantageously increased.

Estimated gross income from copra, $1,050,000 Mexican per annum; no figures on hemp.

Increased facilities for transportation and an undiscovered incentive for labor would doubtless cause agricultural activity in the province.

Respectfully,

H. C. HUMPHREY, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF ALBAY.

ALBAY, *August 19, 1903.*

SIR: I have delayed answering your circular letter of July 10, because I had not the information you desired, and have not until recently had an opportunity to get it. I think the following is reliable, as it was procured for me by the former supervisor of this province, who is now in business here, and is interested in this subject.

Private lands are for sale at the following prices: Rice land costs 50 to 80 pesos per hectare, well-planted hemp land near main roads 100 to 150 pesos per hectare, and hemp land not located near roads from 50 to 100 pesos per hectare.

Ordinary labor costs from 75 cents to 1 peso per day, except in Tabaco and Legaspi, the two ports, where it costs from $1.50 to $2 Mexican per day.

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The principal crops are hemp, copra, ilang-ilang, and a little palay. Increase in hemp production depends on increase in amount of labor. There is more money in hemp than copra at this time, therefore the latter is being neglected for the former. Copra production could be greatly increased if labor was available. A great deal of rice is being raised this season, but under normal conditions very little is planted here, because the same amount of labor in hemp brings so much more revenue. About 200,000 bales of hemp (2 piculs to the bale) is the present hemp output of this province per annum, valued at about $8,000,000 Mexican. The output of copra is worth about $500,000 Mexican per annum and is steadily increasing.

The principal thing needed to increase the agricultural production of the province is more labor, more and better roads, and better facilities of communication. The roads are being rapidly and steadily improved, and when these are in good shape I hope to see new ones opened up. I think the general prosperity of the province depends more on good roads than any other one thing. Next to good roads labor is the most important requisite.

It will afford me pleasure to furnish you any information that I can with regard to the resources of this province.

Respectfully,

W. A. CROSSLAND, Jr., *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF BULACAN.

MALOLOS, *September 1, 1903.*

SIR: I have the honor to acknowledge receipt of your circular letter of July 10 and to reply as follows:

First. Yes; and the price varies, according to the class of soil, from $25 to $500 Mexican per hectare.

Second. Plowmen are paid 1 peso, and sowers 25 cents Mexican per day.

Third. Rice, sugar, corn, sweet potatoes, gabi, and tobacco. The production of these crops could be increased by the use of modern farm implements and irrigation.

Fourth. It is impossible to estimate the value of the crops raised owing to the scarcity of rain in this latitude, this fact having caused much despair among the planters.

Fifth. The lack of working animals and scarcity of rain (as already stated) are the chief obstacles to be overcome in order to obtain larger crops and excite agricultural activity in this province.

It is recommended that there be installed pumping engines, artesian wells, or ditches to furnish sufficient irrigation for the land, that uniform agricultural activity may be maintained and abundant crops assured.

Respectfully,

PABLO TECSON, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF CAGAYAN.

TUGUEGARAO, *August 10, 1903.*

SIR: In answer to your letter of July 10 would state:

First. There are private lands that can be bought in this province ranging from $10 to $250 Mexican per hectare. It is a hard matter to buy land, but it can be done with a little patience.

Second. Laborers are paid 40 cents to 80 cents Mexican per day.

Third. Tobacco, corn, rice, nipa; these are the principal crops in the order named. Coffee and cacao grow well, but not much has been done with them; there are great possibilities here in these two lines. About all the land suitable is now held by the government. Tea and Peruvian bark could be grown here; the latter is now grown in the province, but its value is not understood. Agriculture, with the exception of tobacco, is nearly at a standstill in this province.

Fourth. I am unable to give an estimate of the income derived from crops.

Fifth. The great trouble is to get the natives to work; they do not understand the production of anything but tobacco and corn. Very poor corn is produced; new seed is needed in all lines, the best always being used for con-

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sumption and the poorest for seed. Potatoes and other vegetables would do well here. The fact that good profits can be made from the lines now neglected must be proved by example before the people will take hold. Labor is the great stumbling block.

Respectfully,

WM. E. PEARSON, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

The following in regard to labor contracts, translated from the Boletín Oficial Agrícola de Filipinas of July 31, 1895, is of interest in this connection:

PRINCIPAL CLAUSES IN CONTRACTS OF LEASE AND PARTNERSHIP COMMONLY EMPLOYED IN THE PROVINCE OF NEGROS OCCIDENTAL.

In this island the farmer is not always a landowner; he is sometimes a lessee, and often a partner. Contracts of partnership and lease are as diversified as the different cases to which they are applied.

Sometimes estates provided with buildings, machinery, agricultural implements and stock sufficient to conduct the work properly are let for one-third of the gross product; that is, the owner delivers the estate in working condition and the lessee contributes the necessary annual capital and intelligence. The gross product is divided into three equal parts, one of which goes to the proprietor and two to the lessee. Contracts of this kind were justified in past years by the price of sugar, which was sufficiently high to enable the lessee to cover expense of cultivation and obtain an appreciable return. Whenever the price of sugar suffered any considerable reduction the contract clauses were so modified as to allot to the proprietor no more than a fourth or a fifth of the gross product.

This class of contract presents one difficulty, which is that there is no guaranty to the proprietor of natural fertility of the land; for, in the absence of special clauses to fix the number of hectares which should be cultivated, the fertilizers to be applied or the cultivation to be given to the soil, the lessee must use his own discretion in these matters. As a consequence, he is likely to impoverish the soil in a few years. Some estates are leased at a fixed and determined cash price, the average rental being based upon 10 per cent of the value of the estate when supplied with all the material necessary for its exploitation.

There is a wide divergence in partnership contracts in this island. In some the partner tenants contribute nothing but brains and labor. The owner supplies a certain number of carabao and points out a piece of land for them to cultivate for his account; he is also under obligation to advance the funds with which to pay the day labor absolutely necessary for cultivating the land. In harvest time these amounts are reimbursed to him, plus a certain rate of interest, which is never less than 10 per cent. The partner is charged with all expenses incident to preparation of soil, planting, cultivation, cutting the cane, and cartage to mill. Each of the contracting parties bears the expense of packing his own share of the sugar. The gross product is divided, share and share alike, between the proprietor and the lessee.

There are other contracts, according to which the partner contributes stock sufficient to work the tract of land taken in partnership; but, lacking the necessary capital, this is advanced by the proprietor, who does not usually collect interest for money so advanced. In other cases the partner puts in stock and capital sufficient for the cultivation of the land taken in partnership. He bears the expense of cutting and carting the cane, while the proprietor pays milling expenses. The gross product is divided equally between the proprietor and the partner. A sum of 6 pesos per hectare of calauan (aftermath) is generally collected as compensation for care given same, provided this crop is not the result of sowings.

Various other contracts exist which differ in form from those previously explained, though essentially they are identical. The clauses in these contracts vary according to the education and intelligence of the contracting parties.

For rice there are forms of contracts contingent upon whether or not the partner has cattle for tilling the soil. If not, the proprietor furnishes the lessee with the number of carabao required for seeding and also some funds. All the expense of cultivation is borne by the partner. When the gross product has been gathered the proprietor is reimbursed for the seed which he furnished,

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and the remainder is divided equally between the proprietor and the partner, the latter being bound to return to the former any advances made. Interest is not generally collected unless previously stipulated.

If the partner owns cattle with which to cultivate the fields, the gross product, instead of being divided equally, is divided into thirds, after the seed has been deducted. The proprietor receives one-third and the partner two-thirds.

Contracts of partnership in tobacco are very analogous to these. The proprietor always furnishes cattle for working the land and also the seed. The partner assumes the care as well as all expenses of cultivation. The gross product is divided equally between the contracting parties. The proprietor is reimbursed from the partner's share for the funds advanced by him, the product being valued at the market price. He collects interest, which is not usually less than 6 per cent.

Abaca is generally cultivated on a partnership basis. The following is the form of contract made: It is agreed that after setting out the plantation (the expense of which is borne by the proprietor), the partner cares for the same. He elaborates the product, which is divided equally between the parties, the proprietor being reimbursed for funds advanced in the manner already explained.

When cocoanuts are raised for the purpose of producing the alcoholic beverage called tuba a partnership is formed. The contract is made when the tree begins to yield a return. The owner delivers the grove to the partner, who, in his turn, assumes the work of collecting and selling the sweetened liquid. The amount realized from the sale of the product is divided equally between the parties.

FARM WORK LET BY CONTRACT.

Much of the farm work is let by contract—that is, the payment of a certain sum is guaranteed for a certain amount of work done. The native laborer prefers this method—not from a desire to obtain greater benefit, but in order that he may neither be compelled to work a certain number of hours per day nor six days every week, but may work when it best suits him.

The breaking of uncultivated land, the preparation of cane fields, planting of cane, and other labor required during its growth, such as weeding, covering with earth, etc., are generally let out by contract.

The cutting and carting of cane to the mill are also let by contract, the price of same being fixed per picul of sugar obtained and not per unit of area, for the reason that a certain area may, in two different fields, yield different quantities of cane, according to the distance between plants and the number of shoots sprouted by each.

Carting the sugar to the wharves is also generally let by contract, at an average rate of 1 real (12½ cents Mexican) per picul. On some estates the grinding is also done by contract, the cost depending upon the quality and quantity of sugar.

The rice harvest is regulated by an amount which equals the third or fourth part of that gathered by the reapers, this amount varying according to the economic conditions of the year.

Wages in this island are scarcely ever paid in coin. As a rule the laborer receives for his work a certain amount in coin and the balance in kind—that is, either his food already cooked, or only the amount of palay or rice necessary for his maintenance, besides a small quantity of fish known by the name of Baligon, which he uses as seasoning for his morisquete (boiled rice), his principal source of nourishment. However, in whatever form he may receive his wages, the rate always varies according to the period of the agricultural year when the field work must be done. It may, therefore, be stated that two distinct prices exist, each of which governs during six months of the year.

In dull times—that is, when there is no cane to grind—75 cents per week, with board, is generally paid. Cane is the crop chiefly cultivated in this island and therefore the one which determines the rise and fall in the rate of wages, owing to the large number of laborers required. At harvest time, especially in years when labor is scarce and every day adds to the planter's troubles, $1.25 with board is usually paid to induce people to come from Cadiz and Antique, raising the average daily wages of a laborer to 20, 30, and even 40 cents.

It is impossible to fix exactly the approximate amount of advances allowed to lessees, contractors, and day laborers, as when the demand for labor is great the farmer is compelled to advance the amount required in order that the work

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may suffer no interruption. Besides, during a fortnight of work many of the laborers draw almost all of their income for the next two weeks. Notwithstanding that this is of frequent occurrence, we may say (although the figure is not very accurate) that 15 per cent of the value of the work is approximately the amount it is customary to advance to lessees. Interest upon sums thus advanced is not usually collected, though we know of some exceedingly rare instances where work is conducted upon a small scale in which a charge is made for all money advanced.

The risk incurred in advancing money for labor still to be performed, or to contractors for hiring the people needed for the work of grinding, or in meeting the continual demands of the laborers, is very great, because these laborers rarely perform the work in the time and manner agreed upon, and the contractors either do not furnish the necessary people or, if they do, half of them disappear in a short time, and, finally, the laborers are continually changing masters without repaying the funds advanced to them.

From the foregoing statements we conclude that the average risk incurred in advances—in other words, the amounts advanced for work to be performed—does not fall below 60 per cent.

F. MORENO Y SUIT, *Acting Engineer Director.*

PROVINCIAL GOVERNMENT OF CAVITE.

CAVITE, *September 3, 1903.*

SIR: In answer to your letters of July 10 and August 28, respectively, I have the honor to submit the following replies herewith:

First. It has been impossible for me to secure full and positive information regarding private lands that are for sale or that may be bought. Since nearly half of the area of this province is under private ownership, salable land is probably not lacking. * * *

Second. Daily wages fluctuate between $0.50, $1, and $1.50 Mexican, according to whether or not the laborers receive board and lodging, and according to the ability of the laborer and whether he furnishes implements and working animals. In the latter event he usually receives a proportionate increase for care and food for his stock. This, however, is not the method most generally pursued, the usual proceeding being to form a partnership, by the terms of which one-fourth or one-fifth of the crop is apportioned to the "aparceros" or "casamas," as these farm laborers or copartners are usually called.

Third, fourth, and fifth. The entire crop of rice in the province was and will be insufficient to supply the needs of the pueblos, and the article has been imported for some time; for this reason such laborers as receive $1 per day prefer to take their wages in rice. With the complete extermination of locusts and the importation of working cattle sufficient to perform farm labors the agricultural wealth of this province would soon increase considerably.

Please pardon delay in replying, as it has taken some time to secure the information, which, as you may observe, is not as complete as I should desire.

Respectfully,

D. C. SHANKS, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCIAL GOVERNMENT OF NUEVA VIZCAYA.

BAYOMBONG, *August 20, 1903.*

SIR: Replying to your letter of July 10, I have the honor to state that, under date of May 29, I wrote a report on the agricultural outlook, conditions, and possibilities of this province which covered most of the questions asked in your letter, and which letter was forwarded to the honorable civil governor, suggesting that it might be of interest to your department.

There are private lands which can be obtained by purchase, but there is probably not a single valid and completed title of ownership to a piece of land in the province, and out of some 70,000 hectares of land in the possession and use of natives of this province only about 1,200 hectares are registered by anyone under the former Spanish laws regarding registration of land and real property, and most of that has not gone beyond the first stage of simply registering what was claimed by the parties without submitting any proofs of ownership or proceeding to the point of a completed title for same. Titles consist

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of possessory rights and the boundaries are undefined in any way. Farms consist of little plots of ground in all sorts of shape and rarely exceeding more than 5 or 6 acres in a farm. There is any amount of unoccupied land on all sides, and the natives do not place much value upon the land and frequently abandon same and take up a new piece of unoccupied land, for reasons best known to themselves.

Good choice pieces of rice and garden land, including the water rights for irrigation of same, can be bought for about 15 pesos per acre if the purchaser is willing to accept such a title as the seller is willing and able to give, which is nothing more than a receipt for the money and possession of the property.

Wages usually paid farm laborers are as follaws: From 30 to 40 cents local currency per day and rice worth about 10 cents more, and the laborer takes good care to only do 30 or 40 cents' worth of work, and the labor is difficult to get and not to be depended on at all.

The principal money crop in this province is rice, and there are still thousands of acres of rice land unused.

The income derived from the sale of the surplus rice from this province will not exceed 100,000 pesos per year, as the population is 45,000 wild Igorots and only 16,000 Christians, and the people produce only enough to provide food to sustain life and enough over to sell to buy clothes and pay taxes, but as the great majority are Igorots, who neither wear clothes nor pay taxes, they do not have to worry about any money at all.

The principal obstacles which have to be overcome in order to secure larger crops and greater agricultural activities in this province are, first, means of transportation and communication, which can best be brought about by the building of a railroad through the heart of the island of Luzon from Manila to Aparri. There is no present means to get any products in or out of the province, and to transport farm products to the railway or to some seaport costs from 10 to 15 cents (Mexican) per pound, and you must be aware that there are few farm products which will stand such a cost for transportation as that just named.

The second necessity, provided we had the railroad, would be the introduction into this province of more energetic people, who have higher ambitions than simply existing, because the present natives of this province have no desire to accumulate wealth or acquire property provided that their doing so will necessitate hard labor and industry on their part. They seem to be absolutely happy when they have enough to eat and money enough to buy a few clothes, and having that provided for, they quit work for the rest of the year and refuse to perform any labor beyond daily household duties of cutting a little firewood, carrying a little water, and beatng out the rice for the day's use.

This is not very encouraging, but it is none the less true, and we will never learn anything by deceiving ourselves, so I write you the truth as I find it.

Respectfully,

L. E. BENNETT, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief Bureau of Agriculture, Manila, P. I.

PROVINCE OF CAPIZ.

CAPIZ, *September 9, 1903.*

SIR: Replying to your circular letter dated August 28, 1903, I have the honor to state the following:

First. There are private lands which can be purchased, and which owners would like to sell, in view of the present condition. Prices per hectare are in accordance with kind of land—from 100 pesos for best sugar land to nothing. Considerable has been advertised to be sold for taxes, but no bids received.

Second. Thirty cents Mexican per day.

Third. Rice, buli, tuba of nipa plant, hemp, copra, corn, sweet potatoes, and sugar; and these could be very much increased with modern methods.

Fourth. It is impossible to estimate the amount of income at present time, as no answers were given from the municipalities.

Fifth. The principal obstacles which must be overcome are the ancient system of cultivating and great lack of farm animals. There is great need of modern farm machines for planting, caring for, and harvesting crops, and it is believed that if such implements could be sent to a few of the towns in the province and a practical demonstration of their use be made that as far as

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they are able the people would adopt them. The people are very poor and the province has suffered greatly from locusts and drought. Efforts are now being made to destroy the locust and so far have seemed to meet with success, but there are enough here to cause anxiety. It is believed that enough attention is not given to the cultivation of sugar in this province. The haciendas destroyed during the war have not been rebuilt, and the large amount of capital needed to put them up anew is not in the province. As a consequence large areas of good sugar land is now unproductive. This would make a good investment for American capital.

The resources of the province are very great, and it is expected that the present state of agricultural stagnation is temporary only. This was at one time one of the principal rice-producing provinces in the islands, but since the war enough has not been raised for its own consumption. It would be an excellent thing to bring in a few enterprising American rice farmers, with proper tools for the work, to get the rice growing started again.

Very respectfully,

F. S. CHAPMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF AMBOS CAMARINES.

NUEVA CACERES, *September 4, 1903.*

SIR: In reply to your circular letter of August 28, I have made inquiries and find the following:

First. There is considerable private land in this province that can be purchased. Nothing general can be stated as to price, as it varies greatly in the same locality according to the caprice of the owner. Land has been bought here recently for $1 per acre.

Second. Farm laborers are paid 50 cents Mexican per day. Most of the labor is done on shares. A very industrious laborer in the hemp district can earn $4 Mexican per day.

Third. Hemp, cacao, and rice. The rice crop has been a failure here for the past two or three years, owing to drought, pests, and scarcity of carabao.

Fourth. No data available.

Fifth. The main obstacles to be overcome are the following: Scarcity of carabao, drought, overcome by developing irrigation, and the people shown that much depends upon their own efforts.

Very respectfully,

EDW. S. SHUMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF LEPANTO-BONTOC.

CERVANTES, *August 1, 1903.*

SIR: In answer to your letter of July 10, I have the honor to submit the following for your information:

First. Private lands in the province may be purchased for about 170 pesos per hectare.

Second. Ordinary Igorot farm laborers receive from 12 to 20 cents Mexican per day. An American could not obtain labor for less than 20 cents.

Third. The principal money crops are coffee, cacao, rice, and a little tobacco. All these crops, with the possible exception of rice, could be increased.

Fourth. Coffee will net about 80 to 100 pesos per hectare, rice 30 to 40 pesos per hectare. Of cacao and tobacco I can give you no information.

Fifth. The difficulty of obtaining a requisite number of laborers is the chief obstacle to an increased agricultural activity. The chief difficulty in the marketing of products lies in the cost and difficulty of obtaining transportation to the coast.

Very respectfully, M. GOODMAN, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

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PROVINCE OF CEBU.

CEBU, *September 7, 1903.*

SIR: In reply to your letter of August 28, referring to letter of July 10, I have the honor to state that on July 28 I answered your letter and stated that in order to give accurate information I would send out inquiries from my office. Inclosed you will find a copy of the circular sent out; as yet no answers have been received.

Below are given the only answers obtainable at present.

First. Yes; prices vary according to location; average, $100 Mexican.

Second. Twenty-five to 40 cents per day of about five hours (counting rests). In working American hours, 50 to 60 cents Mexican.

Third. Corn, tobacco, sugar, rice, and copra, in the order named. Could all be vastly increased in both quantity and quality by use of modern methods and energy.

Fourth. Can not tell at present. Know of one 12-acre lot that produced $1,200 Mexican planted to corn.

Fifth. Drought, locust pest, lack of draft animals, steady labor (natives take a rest of several days to spend savings; liable to do this in harvesting season). and a better knowledge of agricultural methods.

In addition I would like to say that a great deal could be accomplished by an experimental farm in making the 1,800 square miles and 650,000 inhabitants of Cebu more productive. There are great areas of mountain slopes which would grow grapes, but which at present only grow poor crops of corn.

Very respectfully,

H. DE LANO, *Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF ILOCOS NORTE.

LAOAG, *September 20, 1903.*

SIR: In reply to your circular letter of July 10, and a second of August 28, I have the honor to state that the questions asked were referred to Mr. Lallave, who is probably known to you as the best-informed man here on agricultural matters, and he informed me that he was then preparing a monograph for your information which would cover the points. He has been recently devoting himself to the extermination of the langosta and has been but seldom in Laoag for some time, and it is probably for this reason that you have not heard from him. I am able to supply you with but general information, but such as it is I am glad to put at your service.

First. I know of several large bodies of agricultural lands now on the market for sale and which could be bought for probably one-half their assessed value. which is $60 United States currency per hectare.

Second. I am securing all the labor I want on public works at 30 cents Mexican per day, and I know of no reason why landowners can not do the same. Offering a monthly wage they could probably do better.

Third. The only reliable crops at present, in view of the devastation being wrought by the langosta, are maguey and tobacco. The area for the cultivation of the latter is limited, but at the present time by no means exhausted. The former is being planted in large quantities. On my last trip north it was reported to me that 250,000 ratones or shoots had been set out during the last year, and that more would be planted this year. There are large areas in the northern part of the province well adapted to the cultivation of this plant which are still uncleared and could be bought cheap.

From the best general information which I can at present gain, I would estimate the exportation of tobacco last year at 13,000 quintals, and that of maguey at 9,000 picos.

It has been proven that there are good coffee, cacao, and indigo lands in the province, and their cultivation should be encouraged.

Fourth. Tobacco slightly less than Cagayan and Isabela prices.

Most of the maguey is taken to Ilocos Sur, as a better price by 20 per cent can be obtained there than here, on account of its being an older market.

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Little attention has been given to coffee, cacao, and indigo since the revolution, and scarcely no crop is being gathered.

Very respectfully,

PAUL F. GREEN,
Provincial Supervisor.

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF ILOCOS SUR.

VIGAN, *September 8, 1903.*

SIR: In reply to your letter of August 28, I have the honor to state the following:

First. There are in this province private lands that can be obtained by purchase at a rate varying from $50 to $200 United States currency per hectare. On account of the small quantity of land and the large number of people, the price of land is very high, but at the prices named there can be purchased a considerable quantity.

Second. The wages usually paid farm hands range from 20 to 40 cents Mexican per day.

Third. The principal money crops in this province are maguey and sugar. They could be advantageously increased by irrigation and the use of modern methods of farming.

Fourth. It would be impossible to give even a poor estimate of the amount of income derived from these crops. They are raised in small lots and by many people, then bought up by the larger dealers, and thus no possible estimate could be obtained.

Fifth. There are many obstacles to overcome to secure better crops. The principal one is the inherent laziness of the people. As a rule they care little for money, and so long as they get along they are satisfied. Then the methods of work which they have need to be changed, new tools introduced, and a general overcoming of the primitive ways which they have been taught and still cling to. The land here is very rich, and it seems to me that if some one who knew how would go to work and help the people to new methods that a fine showing could be made here.

Very respectfully,

J. C. HAWLEY,
Provincial Supervisor.

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF OCCIDENTAL NEGROS.

BACOLOD, *September, 1903.*

SIR: In answer to your circular letter of August 28, 1903, I wish to state that:

First. There are many haciendas in Occidental Negros for sale and at prices less than their assessed value. In the northern part of the province I have been reliably informed that land can be bought for from $5 Mexican per hectare up. This land is rolling and about 4 or 5 miles from the sea, has been cleared, but worked very little, and is very fertile and well suited to the cultivation of hemp, cacao, tobacco, and cane. Sugar lands can be bought from $30 hectare up, according to how hard pressed the owner may be.

Second. Men planting palay get 1 real (12½ cents) per day and food. Men working in cane fields get more, sometimes getting as high as $1.50 per week with food. It should be remembered that a great deal of the farm work here is done by "paquiao" or small contracts—such as planting or transplanting cane, rice, etc.—where the laborers get so much per 1,000 shoots set out.

Third. Indigo was formerly the big crop in Negros, in the sixties and seventies, but died down before the increase in sugar production; now several hacienderos are planting again. Sugar was and is the principal crop here, and cultivated properly will yield good results, though the lack of roads makes the best and freshest lands almost inaccessible. I was informed by Mr. Stevens, a planter from Hawaii, who visited this province last year, that the hacienderos here lost on their sugar in the following manner: First, they raise a poor grade of cane; second, they only get 45 per cent of the juice; third, the sugar made is of a poor grade, and fourth, transportation from fields to mill is costly

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and equally so from mill to coast. Hemp is a good paying crop and is being sown in larger quantities than before. It has the advantage of being very healthy and resistant to grasshoppers; also does not need much care; is generally raised on shares. The demand seems to exceed the supply, as at present a picul of abacá is worth about $27 Mexican. Rice: The best rice lands produce 80 or 90 cavans of palay to the hectare, and it is a very safe crop if locusts don't eat it up. At present prices of rice no crop would pay better. Other crops that bring in money are tobacco, cacao, bonga, and cocoanuts, though none of these are cultivated on a large scale. Tobacco is the money crop of Escalante.

Fourth. Any estimate made would be very wide of the mark, but I think the limit would be not over 1,000,000 piculs of sugar per annum; 100,000 cavans of rice; 2,500 piculs abacá; 2,500 piculs tobacco (this is a pure guess), and 2,000 piculs copra.

Fifth. The great evil here is the lack of money and the system of doing business on credit, by means of which the hacienderos always keep in debt and pay such rates of interest that they will never get out. For instance, they borrow money at 12 per cent (sometimes 30 per cent), bind themselves to buy all their supplies from the house in Iloilo which advances the money, also promise to freight their crops in the company's boats, store in the company's warehouses, and sell through the company, so that by the time the account is closed they find that they have paid about 50 per cent on their loan or more—generally more. With the hacienderos always in debt, I don't look forward to any great improvements in agriculture until people with money come to take a hand in developing the country. My own idea is that agricultural companies and agricultural banks, such as exist in Java and Sumatra, would do a great deal toward opening up the country.

It stands to reason that a man heavily in debt and with bankruptcy staring him in the face does not feel like improving his farm when he may be sold out to-morrow.

Very respectfully, J. D. FAUNTLEROY, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF OCCIDENTAL NEGROS.

BACOLOD, *September, 1903.*

SIR: Replying to your interrogatory to this office of July 10, 1903, I have the honor to advise you as follows:

First. There is always salable land in western Negros, the price of which varies from 25 to 150 pesos per hectare. At present agriculture is in such a state of decadence, owing to lack of capital, death among cattle, cholera, paludism, drought, locusts, rats, frogs, etc., that two-thirds of the private lands are lying uncultivated, and there is now more land for sale than ever before. I may say, practically, that proprietors are willing to sell their land at the assessed valuation.

Second. Laborers receive at the present time 1 peso per week and meals. As regards meals, the frugality of our laborers is proverbial; they are content with a little rice and vegetables or fish, which food they prefer to meat. The cost of meals averages 18 centimos per day per laborer. On the haciendas, besides the field laborers, there are others, employed in the sheds during the grinding season, who receive 1½ pesos per week and meals. The provincial government is to-day paying road laborers 40 centimos daily, without meals.

Third. The crops in the province are sugar, rice, corn, tobacco, abacá, bananas, buyo, bonga, coffee, cacao, copra, tuba, other fruits, bamboo, nutritious tubers, etc., the most important being sugar (our characteristic crop), tobacco, abacá, and corpa, which are exported; the balance are for interior consumption, although at times portions of the same are carried to neighboring islands. It is evident that the agriculture of this province may be greatly increased. With capital, machinery, and improved methods there is not a doubt that agriculture in western Negros, with its soils of exuberant fertility, watered by numerous rivers (constituting a veritable treasure of motive power and which are inexhaustible fountains for irrigation), would take an extensive upward sweep, hitherto undreamed of; for it would be but natural that man's efforts should prove very much more efficacious in this paradise of fertility, where reigns eternal spring,

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than in other countries, in which the planter can only succeed in wresting from the soil the fruit of his sweat by the aid of art and science.

Fourth. It is difficult to calculate the total amount yielded by agriculture in the province at present. In normal times the crop of sugar (with our defective methods of elaboration—to say nothing of defective cultivation—in which according to those well versed on the subject, 45 per cent of saccharin is lost), is about 1,000,000 piculs annually for the entire province. That of rice is estimated at 500,000 cavans; of corn at 25,000 cavans; of tobacco at 8,000 quintals; and of abacá at 1,500 to 2,000 piculs. In the past year the corn crop was larger, and further good increases are also expected in the future in tobacco and abacá, especially the latter, of which planters having resources at their command (taking into account the fact that this plant has suffered very little—in fact, almost nothing—from the consequences of public calamities from which this province and all of the Philippine Islands are suffering, and in view of the good prices paid for abacá, due undoubtedly to its free entry into the United States) have made sowings in such of their land as is suitable to this cultivation.

Fifth. The obstacles at present standing in the way of agricultural progress may be summed up in the scarcity of capital brought about (as is inevitably the case) by a system of tyranny, almost exorbitant, with regard to the calamities and misfortunes from which the planters suffer. Loaning funds at 25 per cent annually is considered a favor, as the usual charge is 40 per cent, and even more in some cases. Banking and commercial houses, in this locality and in Iloilo, loan money on mortgage upon real property ostensibly at 15 per cent, but practically the interest amounts to 40 per cent on account of the conditions imposed by the contract, which are exceedingly onerous to the debtors; such, for instance, as selling the sugar to the creditor or through him; transporting the products via the ships of the creditor; procuring machinery, materials, and other necessaries from the creditor, etc. The depreciation of Mexican money and the reduction in the price of sugar, together with the calamities mentioned at the beginning, may give some idea of the condition to which agriculture and planters in this province have been brought—a condition only remediable by the establishment of agricultural banks which will loan money at reasonable rates of interest. This is the radical remedy for the parent cause of all our present ills. From this spring naturally the problems of means of transportation, scarcity of cattle occasioned by the death of 90 per cent of our stock, perfecting of machinery, and improvement of methods. Then, there is indisputable need of a railway in this province, with a branch passing through the towns of eastern Negros, on the other side of the mountain range; such improvement established, great gains would accrue to the enterprise, considering the present high cost of land transportation, which averages from 10 to 25 centimos per picul over a distance of 8 kilometers. As regards methods and implements of cultivation, these may also be much improved by a study of the land, by planting in each field the products most suitable to its particular soil, and by the employment of cutting implements for palay, of portable machines for turning and plowing the ground which would offset the present scarcity of working cattle, and of laborers during harvest time (which season coincides exactly with that for plowing and planting sugar cane). Now, as regards portable machines, it should be borne in mind that property in this province is very much cut up, and that a portable machine would not have the beneficial results that would accrue if employed for but a single hacienda. However, with good means of communication between haciendas, there is no doubt that the employment of such machines would meet with the highest success, and that the planters would unite in using them. As to the elaboration of agricultural products, we can only speak of sugar, this being at present the most extensively grown crop in this region. As I have already stated, the elaboration of sugar in this province suffers a loss of some 45 per cent of saccharin, according to the opinion of experts, while it is said that in Hawaii the loss of such matter is reduced to some 5 per cent, due to the greater degree of perfection of the machinery and boiling apparatus in use there. Our agriculture and our industries may be said to be still in their infancy, and it is only natural to suppose that they would be susceptible to great progress, considering the inexhaustible resources of our soil.

Very respectfully, L. LOCSIN RAMA, *Provincial Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

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PROVINCE OF ORIENTAL NEGROS.

DUMAGUETE, *September 14, 1903.*

SIR: I have the honor to acknowledge receipt of your kind letter dated July 10 of the present year, which for reasons not of my willing I have been unable to answer in proper time, for which I request that you excuse me.

In accordance with the questions of your letter I beg to inform you of the following:

First. On account of the precarious condition of the agriculture in this province private lands could easily be gotten under the following average prices: Superior class land, from $60 to $100 Mexican per hectare; inferior class land, from $20 to $50 per hectare. These are the prices that prevail generally in the majority of the towns of the province, excepting only the lands of the town of Bais, devoted to the cultivation of the sugar cane, which on account of their special kind are apprized in the average at $200 per hectare.

Second. The average wages for an ordinary farm laborer is 12 cents Mexican a day, with two meals, that generally consist of cooked rice with a little salted fish or dried fish, with fresh vegetables sometimes.

Third. The hemp, from $16 to $20 Mexican per picul of 137½ pounds, according to the quality. Sugar, from $4 to $5 per picul, according to class. Corn, $5 a cavan. I do not have the least doubt that these crops can advantageously be increased.

Fourth. Average income derived from main crops: Hemp, 50 per cent; copra, 25 per cent; sugar, 5 per cent; corn, 40 per cent.

Fifth. Three are the main obstacles to overcome in order to secure greater agricultural activities in this province. First, the lack of capital to protect the farmer, and that only a reasonable interest be imposed; second, the original implements that are heretofore being employed for the field labor, as also the old machinery for the grinding of the crops; third, the natural indolence of our farm laborers.

Very respectfully, D. MCLAREN, *Provincial Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF SORSOGON.

SORSOGON, *September 22, 1903.*

SIR: I have the honor to make the following report on agricultural conditions in this province, in reply to your communication of August 28:

First. Fully one-half of the land of the province may be considered as being on the market. The prevailing prices are, for first-class hemp land, from $50 to $60 Philippine currency per hectare. Second-class hemp land, from $20 to $30 per hectare. Rice and uncultivated lands, from $5 to $30 per hectare.

Second. It is customary to allow the laborers in the field one-half of the crop they market. In exceptional cases where laborers receive day wages the average wage is $1 Philippine currency per day.

Third. The principal crop at present is hemp. In order to increase the crop additional labor is required.

Fourth. It is estimated that two-thirds of the land in the province is planted in hemp. First-class hemp yields an average of 6 piculs per hectare, annually, which sells on the local market at $20 Philippine currency per picul. Allowing one-half to the laborer, the owner nets $60 Philippine currency. Second-class hemp land nets about 20 per cent less.

Fifth. The first obstacle to overcome is additional laborers and draft animals. Then good roads are required to open up a market.

Very respectfully,

E. WESTERHOUSE, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

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PROVINCE OF TARLAC.

TARLAC, *September 11, 1903.*

SIR: Referring to your favor of the 28th ultimo, concerning land, wages, and agricultural products, I have the honor to reply to your questions, but I have such little information myself that my answers are very unsatisfactory:

First. There are private lands in this province, and the only sale that I know of was for about $100 United States currency per kiñon. There seems to be no recognized price for land, and the price, so far as I can ascertain, depends on how necessary it is for one man to sell and how much the other wants the land.

Second. Ordinary farm laborers, I am told, receive from 20 cents to 40 cents Mexican per day. I have to pay 50 cents per day for common laborers on road work.

Third. The principal crop of this province is rice and the second in importance is sugar. They could both be greatly increased.

Fourth. I can get no reliable information as to the amount of income from these crops. Upon inquiry I got such different answers that I concluded they were wild guesses.

Fifth. More work animals and better methods of farming are necessary to larger crops and greater agricultural activities. It is my opinion that no more than one-twentieth of the land in this province suitable for successful agriculture is being cultivated.

Respectfully, S. C. PHIPPS, *Provincial Supervisor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

PROVINCE OF ZAMBALES.

IBA, *September 13, 1903.*

SIR: Replying to your favor of the 29th of August, 1903, I beg to state:

First. That there are in this province private lands which may be bought at the price of $80 per hectare.

Second. That the wages ordinarily paid to laborers amount to 1 peso per day.

Third. The principal crop of this province at present is rice; sugar cane is also cultivated, but upon a small scale, and the yield is only used for local consumption. I believe that these crops could be improved.

Fourth. The present crop of rice may be estimated at approximately 270,000 cavans and that of sugar cane at 10,000 piculs.

Fifth. To secure a better harvest of the products mentioned in No. 3, it is necessary, in my opinion, to overcome two chief obstacles, which are lack of carabao and frequent drought. In order to overcome these obstacles, planters should be supplied with capital to enable them to buy carabao and construct irrigation canals. Such capital could be furnished them if an agricultural bank were established in this province.

There are 27,375 hectares of land under cultivation and there are 31,870 hectares of public lands which could be cultivated.

Respectfully,

POTENCIANO LESACA, *Governor.*

Prof. F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture, Manila.

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[Extract from Official Handbook on the Philippines.]

PART I.

CHAPTER VII.

AGRICULTURE.

[Revised by Dr. Frank Lamson-Scribner.]

Varieties of soil—Varieties of plant life—Rainfall—Rice a staple crop—Varieties of rice—Work of bureau of agriculture—Rice cultivation pursued with care—Methods employed by natives—Work done by hand—Ravages of locusts—Modern machinery—Corn—Sugar industry—Crude methods which obtain—Varieties of cane planted—Soil requisites—Primer on the cultivation of cane—Lands adapted to the growing of cane—Land titles—Sorghum—Tobacco—Spanish monopoly—Manufactures of tobacco—Tobacco lands—Coffee plantations destroyed—Soil suited to coffee growing—The cacao—Philippine cacao unsurpassed—Varieties of cacao—Gum chicle—Stock raising—Grazing lands—Water supply—Forage grass (zacate)—Cogon—Native horses—Ilang-ilang—Cocoanut—Sesamum—Lumbang—Jatropha Curcas—Peanut—Nutmegs—Cinnamon—Indigo—Other dyes—Leguminous plants—Starch-producing plants—Fiber plants—Rattan—Bamboo—Vegetables—Fruits.

As the Philippine Archipelago lies between the fifth and twenty-first degrees of north latitude, with a great range of elevation and variety in the composition of soil, it necessarily presents marked variation in its vegetation, both in the forest and in the cultivated field. A crop report, if in any measure complete, would contain the names of many crops entirely unknown to the more temperate zones of the United States, while such staples as wheat, corn, and oats would scarcely appear at all. In general, the flora is tropical, while in the southern part it becomes equatorial. There is also a marked difference in the vegetation between that produced on the Pacific coast and that of the China sea. In the former region the rainfall is both greater and more frequent than in the latter, and as on the eastern coast the mountain ranges crowd close to the sea its agricultural area is limited.

Rice.

Next to hemp, which has been treated elsewhere, rice is perhaps the most important crop raised on the islands, and constitutes the staple and almost exclusive food of the natives, as indeed of most of the uncounted millions of the poor people of the entire Orient, and there is practically no limit to the demand.

Rice is said to have in the East not less than 1,300 different local names, and it is said that Bengal alone has displayed 4,000 distinct forms of rice, which differ as to color, shape, size, etc. In the Philippines over 100 varieties are cultivated. These are divided into 2 groups—the highland rice, grown where irrigation can not be used, and the lowland, that depends upon irrigation. The yield from seed varies from 40 to 100 grains of crop to 1 seed, a fifty-fold increase being considered a good average. A family of 5 persons will consume about 250 pounds of rice per month, being used in almost every native dish, and takes the place of bread. The unhulled rice is fed to horses, cattle, and fowls.

The condition of the rice industry is such that it requires the earnest attention of the government, for, owing to the ravages of war, the loss of the carabao, and the primitive and laborious methods that have hitherto been employed, the crop has not been sufficient to meet the demand, and large shipments have been made from China in order to feed the people. The deficit for the year 1902 amounted in value to something like 4,000,000 pesos. It is strange that with its fertile soil and the abundant supply of water, both from the clouds and from streams, the islands have never been extensive exporters of rice.

The agricultural bureau of the Philippines has made close inquiry into the methods followed by native planters, and has endeavored to improve the situ-

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ation by the introduction of some new and productive varieties of seed rice, but the root of the evil lies chiefly in the methods of cultivation followed. The importance of this staple crop is such that it is the purpose of the bureau to make a thorough investigation of the various methods now in vogue in the Orient in rice culture, and especially of the methods which permit French Tonquin to produce a sufficient quantity to provide for the wants of its dense population and to permit an annual exportation valued at $18,000,000 gold.

Rice growing is one of the few occupations which the natives pursue with extreme care, though the crude appliances employed do not permit great profits to accrue to the cultivator. The Philippines, like most oriental countries, have pursued the policy that human labor is cheaper than machinery, and therefore everything is done by hand. With the exception of land cultivated by the Igorots, but one crop is produced in a year, and that is grown during the rainy season. The land is allowed to remain idle during the dry months and grows up with weeds, Bermuda grass, etc. When the rain commences the water is allowed to stand in the paddies, and when the ground becomes thoroughly saturated with water it is plowed, carabaos being the draft animals employed. The plows are very crude—being little more than a forked stick to which is attached a cast-iron point. The first plowing simply scratches the sod; the second, at right angles to the first, breaks it still more, though there is no deep plowing or turning over the soil, and after plowing several times the land is harrowed with a bamboo harrow, this implement being constructed of the larger basal joints of a species of bamboo which has numerous stout branches at each node, these branches being cut off 10 or 12 inches from the joint and the several pieces of bamboo lashed together with rattan.

The rice is first propagated in specially prepared paddies and from these to the paddies in which it is to be grown, a few young plants being thrust into a hole made in the soil and the earth slightly packed around the plants, which are planted a foot or two apart each way, all this work being done by hand—imagine an American farmer transplanting 10 acres of sprouted wheat by hand.

All the work of harvesting is also done by hand, the heads being gathered one by one, and when tied into bundles is known as "palay"—that is, unhulled. Much rice is bought and sold in this condition, especially in towns where there are large rice warehouses and rice-hulling machinery. Practically all the rice for local use, however, is hulled by hand by pounding the palay in great mortars, this work being mostly done by the women of the household, who pound out what is needed for food day by day, or, at most, an amount that will last for a week or two. In and about Quiañgan, Nueva Vizcaya, the Igorots, by artificial irrigation, produce two crops each year, their rice being of superior quality, with larger, practically awnless heads and larger grains than are seen elsewhere. The locust is a formidable enemy to rice, sometimes destroying an entire crop, causing great suffering among the poor. It is the opinion of the agricultural bureau that rice cultivation can profitably employ modern machinery. The soil can be plowed, the grain can be drilled, and the crop harvested and thrashed, as is done in the fertile rice districts of Louisiana, where profitable returns are secured by these methods. There can be no question but that through the object lessons constantly given by the government farms the condition of rice culture will constantly improve, to the marked benefit of the manner of life among the people.

Corn.

Corn is a cereal which sometimes gives abundant crops, its flour making excellent food, and the Visayans make an alcoholic drink from the grain, which they call "pangasi." It is indigenous to America, whence it was brought by the Spaniards. The natives at first looked upon it with indifference, until, on account of the frequent loss of the rice crop, they became accustomed to its use, and in time its cultivation became quite general throughout the archipelago, especially in those regions where the soil is not altogether suitable for the cultivation of rice—as in Cagayan and Isabela.

Sugar.

The importance of the sugar industry in the Philippines is generally recognized. The splendid results that have been obtained in Hawaii for many years have focused attention upon the sugar possibilities of the Philippines. In 1900 the islands produced all the sugar required for domestic consumption and a surplus for export which amounted to a trifle over 60,000 long tons. With the

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exception of hemp, this industry gives employment to more of the rural population than any other branch of agriculture. The fact that the area devoted to cane has been reduced, owing to vanishing profits, has entailed suffering in the rural districts that has extended far beyond the landed proprietor or owner of a sugar estate. Abandoned cane fields and idle mills throughout the archipelago indicate a depression of such magnitude that active steps are being taken by the government to rehabilitate the industry and make it show a balance on the right side of the ledger.

The poor state of production in which the archipelago stands with relation to other countries depends, in a large measure, upon the deplorable system of cultivation. In the Philippines there is scarcely known, much less employed, a single one of the thousand well-perfected agricultural machines, the use of which in other countries is general. For this reason the work is done in an imperfect manner. There is, in fact, no system of agriculture, properly so-called, and the greater part of the people have no idea of what agriculture really means. The carabao is used to haul a wooden plow (as old as the pictures on the temple walls of Egypt) through the ground. The plant receives but little cultivation, and is allowed to take care of itself until harvest time, and the same crude, slipshod methods are employed in extracting and crystalizing the juice of the cane. The cane is crushed by being passed through mills or cylinders of wood or stone, with intermeshing teeth, which extract only about 70 per cent of the juice, which is collected and boiled in open kettles, a little lime being added to purify it. When the boiling has reached a certain point it is passed to a second kettle, where the boiling is continued until it reaches a certain stage, recognized by those who are considered experts in the business. It is then poured into conical molds, which are placed upright, so that the molasses may drain off. These molds are placed over small jars, where they remain until the sugar is formed, it being then free from molasses.

It will be seen, therefore, that there is opportunity for vast improvement in these methods, and something has already been accomplished. The cane grown has been confined to the green and yellow varieties of probable Japanese origin. These canes, though rich in sucrose, are generally small and insufficient in tonnage yield per acre. Furthermore, whenever there is a steady decrease in size from lack of proper cultural methods the deterioration is accompanied by an increase of fiber, which represents a further loss at the mill. The many useful striped, rose, and purple canes that have contributed to bring Hawaii to the fore as the most prolific and profitable sugar region in the world have not yet been cultivated in the Philippines. Through the enterprise of Capt. George P. Ahern, chief of the forestry bureau, an importation of Hawaiian canes has been made, and by the rapid propagation and further introduction by the bureau of agriculture distributions of these improved varieties will be made to planters.

With the possible exception of tobacco, there is no staple agricultural crop where the physical condition of the soil plays so important a part as it does in the growing of sugar cane. It is a plant that, by virtue of its great size and rapid growth, not only drains heavily upon the fertility of the soil, but its shallow root system and restricted area for each plant demands that the mechanical condition of the soil be such as to facilitate in every way the full exercise of the root's functions. In all regions and in all sugar-producing countries a strong, deep, argillaceous or slightly calcareous soil has always been found best suited to meet these requirements.

In the sandy, sedimentary, alluvial soils along the seacoast, or in rich mountain valleys heavily charged with the humus in which the cane rejoices, phenomenal crops are often taken, but for long-continued cropping and with a minimum of restoratives the soils first mentioned are those which have longer withstood the crucial test of time. Such lands as these abound in the archipelago, and often extend for miles along the lower and easily cultivated foothills, and offer a more inviting field of operation than many of the apparently more alluring valley lands along the coast. For the purpose of improving the management of existing sugar plantations and the intelligent establishment of new ones the Philippine bureau of agriculture has published, in both English and Spanish, a primer on the cultivation of sugar cane, which treats in a simple, clear manner of such important subjects as soil conditions and fertility, preparation of the soil, selection of seed cane, planting, after treatment, harvesting of the crop, management of the stubble, drainage, irrigation, etc. This work, in connection with the instruction given in agricultural schools and the example of proper cultivation as demonstrated on the government farms, with the introduction of modern machinery, both farm and manufacturing, will in a short

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time produce a marked change for the better in the sugar returns from the archipelago. It is impossible to state how much land is adapted to the growing of cane or how long it will take to develop the industry before the Philippines become one of the important sources from which to draw sugar. However, with a soil and climate second to none, a reasonable supply of labor, and especially if the Congress of the United States should lower the present rate of duty upon sugar imported from the Philippines, the development of the industry will be constant, if not rapid, and may well engage the attention of those interested in sugar production.

Under the present government means have been provided for perfecting and transferring titles. The Philippine Commission has enacted legislation, subject to the approval of Congress, by which government land to the amount of 2,500 acres may be acquired by a single corporation, and it is thought that all of these influences will contribute to the rehabilitation of the sugar industry. Its growth, however, will, under the most favorable circumstances, be so gradual that the sugar growers of the United States, both of beet and cane, need have no fears of competition so serious as to endanger their business. There is an abundance of room for both, for it will be many years before the annual consumption of the United States can be raised on American soil.

Although sorghum, or batad, has given excellent results in the United States and elsewhere when cultivated for sugar or the production of alcohol, it is used in the Philippines only for fodder.

Tobacco.

Tobacco leaf, cigars, and cigarettes have formed a considerable item in the exports of the Philippine Islands. Until the year 1882 the Spanish Government had a monopoly of the tobacco industry, and much of the discontent that existed up to that time among the natives was due to the tobacco monopoly laws which were on the statute books and the vigorous manner in which the officials enforced them. The natives in whose provinces where tobacco could be produced advantageously were compelled to plant a certain amount of land in tobacco, and the entire product of the islands was required to be delivered to the government warehouses, where payment was made at prices arbitrarily fixed by the Spanish Government. Each unmarried man who cultivated tobacco was required to set out 4,000 plants each year, and each married man was required to set out double that number. There were government inspectors who supervised the planting, cultivating, and harvesting of the crop, and who also required that it be packed in a certain way and shipped at a certain time to the government warehouse.

The natives were not permitted to use the tobacco which they grew. Penalties were provided for those who smoked cigars and cigarettes, and it was not an uncommon thing for a native engaged in tobacco raising to be put in jail for smoking a few leaves which he had raised himself and which he had rolled into a crude cigar or made into a cigarette. The price paid by the government for tobacco under the monopoly was about one-half what is now paid. During a good portion of the time the monopoly was in force, particularly the latter part, payment was made in scrip, redeemable at the option of the government. For a number of years this scrip was paid out with a fair degree of promptitude, but after a time payment was deferred for so long a period that it often sold for one-third of its face value.

The injustice worked through the tobacco monopoly in the Philippine Islands became so great, and the natives had become so incensed over the unjust treatment accorded them, that finally the Spanish Government was compelled to abandon the monopoly, which was done by royal edict in December, 1882.

The tobacco business is now conducted as any other industry in the islands, and large factories have been erected for the manufacture of cigars and cigarettes. This is one of the important industries of Manila, which practically controls the manufacture and export of tobacco, and many people are thereby given employment.

From its monopoly of the tobacco industry the Spanish Government derived a revenue which for several years amounted to about $4,000,000 annually. The number of officials employed in this branch of the service alone exceeded 400. The cutting off of this source of revenue proved so serious a blow to the finances of the islands that it was found necessary to increase taxes in other ways. License fees were increased, the cedula, or head tax, was made heavier, and an export tax on leaf and manufactured tobacco was put in force.

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The cigars manufactured in Manila are sold at a very low price. The average price lists of the various manufacturers in Manila show a range of from $10 to $75 silver per thousand. The ordinary cigar of Manila, of fair quality, sells for about $4 silver per hundred, or less than 2 cents apiece in United States money. There is but little tobacco and few cigars shipped from the Philippines to the United States. Freight charges, customs dues, and internal-revenue taxes so increase the cost that they can not compete with American-made cigars. In China, Japan, and India, Manila cigars are used almost exclusively, and there is a constant increase in the export of both leaf and manufactured tobacco. Since August 13, 1898, the date of American occupation, to June 30, 1902, cigars were exported to the following countries from the Philippines:

	Value.
United States	$22,453
United Kingdom	1,617,559
China	855,753
Hongkong	893,534
Japan	107,543
British East Indies	558,848
Australasia	790,900

Smaller amounts were also exported to many other countries, making a total value of $5,399,759.

Since the abolition of the monopoly the tobacco industry has increased in all regions to an extraordinary degree, both in quantity and quality of the product. As a result of the Habana school of gathering, curing, and manufacturing the leaf, the product has become popular throughout the country. A full knowledge of the fermentation or preparation of the leaf is still lacking, or perhaps this work is carried out under adverse conditions, so that the leaf has not acquired the full aroma and strength of the Habana leaf, but the different processes are constantly being improved.

When the Philippine Commission made a journey up the Cagayan Valley, in Luzon (1901), it was informed that practically all the good tobacco lands were under cultivation, and among the natives the "good land" was understood to be those parts fertilized annually by the overflow of the river. It was stated that the other land was not considered first class, because it would only produce tobacco for ten or twelve years without enrichment, the subject of fertilizing never having received any attention from the planters of that region.

The qualities which determine the price of tobacco are combustibility, strength, aroma, fineness, elasticity, color, and uniformity. Intelligent and experienced direction by practical men, with scientific aid in the matter of seed selection, instruction in cultivation, curing, and marketing, such as will be furnished by the bureau of agriculture, will enhance the quality and value of Philippine tobacco until it will become second to none, for already the leaf from the provinces of Isabela and Cagayan compares favorably with that of the Vuelta Abajo district of Cuba. That from the Visayan Islands is coarser, more intense in color, and stronger in taste, while the leaf from the Province of Nueva Ecija is fine, but rather bitter in flavor and yellow in color.

Don Rafael Maramag, the president of Ilagan, states, in the Commission's report for 1901, that the tobacco crop for the current year was very good; that in the Province of Isabela the land was for the most part in small holdings of from 1 to 1½ hectares, and that a hectare of tobacco land would produce in an ordinary season about 60 bales of tobacco, worth $6.50 Mexican per bale, of which over one-half would be profit. So the crop is an extremely profitable one, especially for families with small holdings, where much of the labor can be performed by the women and younger children of the family. Tobacco growing on a large scale would afford opportunity for the employment of much improved and labor-saving machinery.

Coffee.

Coffee has been cultivated in the Philippine Islands for more than a century. It was first planted in the Province of Batangas, and the same sad story of neglect and deterioration that has been told as to other products of the islands is repeated in the history of coffee culture. This crop has suffered from lack of proper transportation facilities, for competition in all crops is now so active that none of them can overcome the handicap of high freight charges, and every neglected field is a silent argument for better roads and harbors. For many

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years but little attention has been paid to coffee growing, notwithstanding the fact that the neighboring island of Java became wealthy through coffee and set the standard of excellence for the world.

The remarkable extension of coffee planting in almost every part of the Torrid Zone has so increased the supply that only the better qualities can command remunerative prices, and this fact lends hope to the future development of this industry in the Philippines, for its berry compares favorably with that of Java or Martinique, and there are certain favored localities which produce coffee which, according to the judgment of experts, can be compared only to Mocha.

The red fertile lands of the mountain sides, resembling the best coffee lands of Porto Rico, with a porous subsoil, where the rainfall is abundant and regular, with an ideal climate for the coffee tree, is an alluring prospect. Until a few years ago this was an important industry in various parts of Luzon and other islands of the groups. In 1891 an insect made its appearance in the coffee plantations which destroyed the trees, and practically all of the big coffee plantations have now been abandoned. When the industry was flourishing over $4,000,000 worth was exported in a single year, while since the date of American occupation to June 30, 1902, but $23,102 worth found its way to foreign markets. There is no question that with scientific attention directed to the matter, means would be found to overcome the ravages of this insect and enable trees to grow and render tribute to the wealth of the islands.

As coffee is one of the most important of the tropical commodities imported into the United States, which under no possible condition can be raised in any of the States, it would seem to be good policy to direct legislation so that the market of the United States should be the market where its insular possessions could dispose of their surplus products. In 1902 there were imported into the United States 1,090,636,832 pounds of coffee, valued at $70,919,257.31, all of which was entered free of duty. It has been urged in the Congress of the United States that a duty be placed on coffee imported from foreign countries, and allow it to enter free from the insular possessions. Under the stimulating influence of such a policy, applied not to coffee alone but to rubber, hemp, sisal grass, gutta-percha, copra, cacao, dyewoods, etc., and other products of the field and forest, of which the United States imports annually to the value of from $150,000,000 to $200,000,000, and all of which is now on the free list, Philippine agriculture would be revolutionized and the islands enabled to rival Java in the wealth of the their products.

An especially fine coffee is grown on the mountain regions of Benguet and Bontoc and in the Province of Lepanto. The trees yield heavy crops, and unhulled coffee sells readily in Manila at $35 Mexican per cavan, for local consumption or for shipment to Spain, where the Philippine berry is highly appreciated. The coffee comes into bearing in Benguet in three years, and there is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to health.

Coffee can be grown on most of the islands where there are timbered gulches or ravines and up to an elevation of 2,000 feet. The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poor natives could raise and market coffee with but little instruction.

There are few sights more beautiful than a well-conducted coffee plantation in full bloom. Neither the blush of the apple blossom, the snowy plum, nor the pink of the peach can compare with the exquisite beauty of the coffee tree, where nature has excelled herself in combining those rare qualities which delight the eye, tickle the palate, and render good return for the labor and capital invested.

Cacao.

The cacao grown in the Philippines is of such excellent quality that there is keen rivalry among buyers to procure it at even an advance of quite 50 per cent over the price of the export grades of the Java bean, and this notwithstanding the failure on the part of the local grower to "process" or cure the product in any way. In parts of Mindanao and Negros, despite ill treatment or no treatment at all, the plant exhibits a luxuriance of growth and wealth of productiveness that demonstrates its entire fitness to be considered a most valuable crop in those regions.

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The importance of cacao growing in the Philippines can hardly be overestimated, as recent statistics place the world's demand for cacao (exclusive of local consumption) at 200,000,000 pounds, valued at more than $30,000,000 gold. There is little danger of overproduction and consequent low prices for many years to come. So far as known, the areas where cacao prospers in the great equatorial zone are small, and the opening and development of suitable regions has altogether failed to keep pace with the demand.

Cacao is cultivated in a small way nearly everywhere in the archipelago. It is grown in several provinces in Luzon, in Mindanao, Jolo, Basilan, Panay, Negros, Cebu, Bohol, and Masbate, and its presence can be reasonably predicted upon all the larger islands anywhere under an elevation of 3,500 feet. In most cacao-producing countries its cultivation has long since passed the experimental stage, and the practices that govern the management of a well-ordered cacao plantation are as clearly defined as are those of an orange grove in Florida or a vineyard in California.

In widely scattered localities the close observer will find in the Philippines many young trees that in vigor, color, and general health leave nothing to be desired, and with due precaution and close oversight there is no reason why the growing of cacao may not become one of the most profitable horticultural enterprises that can engage the attention of planters in the Philippines. The cacao loves to "steam and swelter in its own atmosphere," and a bulletin has been issued by the agricultural bureau of the Philippines giving instructions as to how to select the locations best adapted to the growth of the plant and the soil, drainage, and general attention required.

The cacao, relatively to the size of the tree, may be planted very closely, for it rejoices in a close, moisture-laden atmosphere, and thus permits a closer planting than would be admissible with any other orchard crop.

There are a number of varieties of cacao in general cultivation, which may be referred to three general types—the criollo, forastero, and calabacillo. The criollo is undoubtedly the finest variety for general use. On breaking it is found to be whitish or yellowish white, while the seeds of those plants in which the forastero or calabacillo blood predominates are reddish, while the forastero is almost violet in color. For flavor, freedom from bitterness, facility in curing, and high commercial value the criollo is everywhere conceded to be the best. The others, however, yield better, are more vigorous, and not so liable to disease.

The bulletin describes the method of planting, cultivation, pruning, and harvesting the crop. Attention is also given to the enemies and diseases of the cacao, and among the former are mentioned monkeys, rats and parrots. The estimated cost and revenues derived from a cacao plantation are given for a series of years, and the bulletin concludes with the statement that "the difference between good returns and enormous profits arising from cacao growing in the Philippines will be determined by the amount of knowledge, experience, and energy that the planter is capable of bringing to bear upon the cultivation in question."

Chicle.

The extraordinary demand that has sprung up within a few years for gum chicle has added another article to the long list that is being supplied by the Tropics. The consumption of chicle has become so great that the propriety of calling it a minor product may well be questioned. It is the foundation of all the fine chewing gums in the market, and practically all the gum raised is sent to the United States and used by the American Chicle Company, which combines it with starch, sugar, and flavors, and in this form it finds its way around the world and to an ever-increasing number of victims to the harmless but unlovely gum-chewing habit.

The tree that produces gum chicle is *Achras sapota*, which also produces a fruit prized in many Philippine gardens, known as "chico." It is grown largely for its fruit, and the natives are generally ignorant of the far greater money value of its abundant milky sap or latex. The tapping of the tree, the collecting of its elastic sap, and the preparation of the gum involve none of the complicated processes required for the coagulation of rubber and are extremely simple. It is estimated that 3 or 4 pounds of gum can be withdrawn from a full-grown tree without injury, provided the tappings be conducted between January and July.

Multiplications by seeds or cuttings is tedious and, except in skilled hands, uncertain; but Filipino gardeners employ a system of marcottage that is worthy

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of a brief description. The process is to split in halves a single short joint of bamboo and then encircle a branch or limb of the tree with the two halves and then tie them together with rattan. This makes a cylinder around the stem, and the bamboo being cut at a joint is practically closed at the lower end. Before placing the tube, the leaves are stripped from that portion of the tree where it is to be tied and the bark of the branch slightly nicked with a knife.

The tube is then filled with fine, light soil. In a few months the tube will be full of roots and the branch, cut off below, is ready to set out, and is a young tree of a size and vigor that could not be expected in less than two or three years from seed.

This undeveloped industry promises to become important in the Philippines, and as gum chicle is on the free list of the United States tariff, it could be made to be a source of handsome profit to the grower.

Stock-raising and grazing lands.

Stock raising in the Philippines, like the same industry in Cuba, must be built up anew, as a result of the ravages of war, to which in the former place must be added the loss occasioned by the rinderpest, which carried off about 90 per cent of the cattle of the islands. Prior to the outbreak of hostilities one writer stated that he saw herds of cattle and horses, and droves of sheep, goats, and pigs everywhere. General Otis also in his report speaks of large herds of cattle, and that some localities are distinctively cattle-raising districts. Fine grazing lands are to be found in eastern Pangasinan, northern Nueva Ecija, Nueva Vizcaya, Isabela and Cagayan, and probably in other provinces of Luzon, and certainly other islands. In the three provinces first named are rolling uplands, and in the latter broad, level prairie lands, although as far as abundance and quality of the grasses are concerned there is apparently no difference—the same species growing both on the prairies and hills. These grasses consist of one or two species of *Panicum* and *Eragrostis*, and many representatives of several genera of the *Andropogonæ*, *all* fine-stemmed, fine-leaved grasses, which in the United States would be popularly known as "bunch" grasses, as they grow in small tufts, not being truly turf forming; yet there is sufficient of the latter to prevent gullying or washing, notwithstanding the heavy tropical rains to which the region is subject. Near the streams and in the river valleys, about rice paddies, etc., Bermuda grass is abundant, and near the coast Korean lawn grass is found everywhere.

The grazing lands in eastern Pangasinan, northern Nueva Ecija, and throughout Nueva Vizcaya are characterized by their hilly, rolling character, the ravines and small valleys, tops of the higher hills, and surrounding mountains being densely forested. In every small valley one finds streams of clear, pure water, it being impossible to travel more than 3 or 4 miles in any direction without finding good water. Hence, it will be observed, that there is an abundance of feed, water, and shelter—the requisites for an ideal cattle country—and especially to be noted here are the topographical features of the country, which, in case of epidemics of rinderpest, are of especial value, as in these valleys whole herds of cattle can be isolated and, with a little care and watchfulness, guarded for months against infection by contact or through the water supply.

The water supply is especially to be noted, as in the numerous mountain streams the water is perfectly pure and as clear as crystal, except immediately following a heavy rain. These streams during the rainy seasons, like the great rivers, are subject to great and sudden rise and fall, and from a quiet babbling brook one may change in a few minutes into a raging mountain torrent; yet where the mountains are heavily timbered the rise and fall are more gradual and do not go to extremes.

The grazing lands of Isabela and Cagayan differ from the above in being almost perfectly level, or but gently rolling, typical prairie lands, extending almost as far as one can see in all directions, limited by the coast range on the east and the great central range on the west, and extending from some distance south of Cordón north to the coast. The same species of grasses are found here as in the ranges of Nueva Ecija and Nueva Vizcaya, and the quantity and quality are about the same. This great valley consists of open country with isolated trees, or sometimes small groves, with more or less forest land along the streams. The country is well watered by the numerous tributaries to the Cagayán River. In this valley the unbroken ranges are far more extensive

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than in the mountain regions, but at the same time in case of an epidemic of rinderpest there is not the same opportunity of isolation as a means of protection against the disease.

Cattle raising for the home market should be a very profitable undertaking in northern Luzón, if one can judge by the prevailing high prices of meat in Manila, and the fact that practically all the meat consumed is shipped in on the hoof from Singapore or as refrigerated meat from Australia and the United States. Certanly the conditions in Luzón are ideal for this industry, and the grazing lands of the island can not be surpassed by any in the world and certainly not equaled by 90 per cent of the grazing lands in the United States.

Hundreds of acres in these open ranges in some sections would produce a great abundance of native hay, and once the question of transportation is solved the Manila market could be cheaply and easily supplied with thousands of tons of it, as in many sections under natural conditions there would be a heavy yield of a fine quality of hay per acre, the natural lay and condition of the land being such that cutting and harvesting could be done by machine. At present thousands of tons of hay needed in these islands for the support of native ponies, and especially for United States army horses and mules, are imported from the United States and Australia.

Under the name of "zacate" are included several species of grass which produce the forage of the live stock, especially horses. The chief ones of these belong to the genus *Leersia*. The zacate fields are objects of much care on the part of the native farmers, especially if in the vicinity of large towns, as the returns are excellent, and the grass may be cut several times a year. The cogon grass (*Saccharum* species) reaches a height of 2 meters or more, forming a dense jungle almost impossible to traverse. The natives, with the object of obtaining fodder, are accustomed to set fire to these grass fields in the dry season and are thus enabled to obtain the young shoots, which are much relished by the cattle. In regions where the nipa does not grow, cogon is employed for thatching houses.

The native horses are small but very strong, resembling those of Java, and endure a great deal of hard treatment. No attention is paid to the breed or blood, and no doubt much could be done in this direction by importing from other lands such animals as seem best adapted to thrive in the climate of the Philippines. The ever present and indispensable carabao is also susceptible of improvement, and breeding animals have been imported by the government for this purpose. Hogs are also raised, or rather allowed to propagate, in the same careless, slipshod manner that characterizes all other insular industries.

Essential oils.

Among the other products of economic value in the Philippines are a number of essential oils, but the most important is that produced from the blossoms of the ilang-ilang tree. It is botanically known as *Cananga odorata* (Hook) and belongs to the custard-apple family. It grows both in a wild state and under cultivation, bearing leaves about 2½ inches wide by 6 inches long, and yellow blossoms some 3 inches long and of extraordinary fragrance, from which is distilled the attar of ilang-ilang.

The attar of roses, the famed essential oil of the Damask rose of the Balkans, finds a competitor in this Philippine product, considered by some as its equal in perfume, gives a greater yield of essence, and is therefore a less expensive basic element for the perfumer. The ilang-ilang, while indigenous to many parts of tropical Asia, grows best in the Philippines, where it is a favorite with the natives. The tree is common to many localities south of Manila, being found chiefly in the well-populated islands and provinces, and it is said that it thrives best near human habitations. It is propagated in plantation by seeds or cuttings placed about 20 feet apart in each direction, and grows rapidly in almost any kind of soil. The flowers appear in the third year, and when the tree is 8 years old it will yield as high as 100 pounds of blossom. It blossoms every month, but the best period is from July to December.

The process of converting the long yellow petals into essence is by the simplest form of distillation, no chemicals being required. The oil vaporizes in a closed boiler at a temperature of 220° F. The first quality must be clear as distilled water and of course fragrant, while the second grade is somewhat yellow and smoky. The oil is drawn from the bottom of a glass separator, filtered through talcum, and is then ready for market. About 75 pounds of flowers will yield one pound of oil. The flowers are worth from 8 to 15 cents gold per pound, and

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it costs about $4 to manufacture. It is practically without competition in the markets of western nations and readily sells at from $40 to $55 per pound, the supply being unequal to the demand. The perfumes of Europe and, to a less degree, those of the United States, make it the basis of some of their most expensive extracts. There are flowering groves in many parts of southern Luzón and the Visayan Islands, and the tree abounds in the vicinity of Manila.

Among the oil-producing plants of the archipelago the cocoanut easily holds the first place, as its various products satisfy so many industrial, economic, and medicinal wants. It belongs to the palm family and many varieties are found in the Philippines, especially in the Visayan Islands, where they have local names. An analysis of the meat in the cocoanut, according to Buchiver, is as follows. Water, 31.8 cent; stearin and olein, 47 per cent; albumen, sulphate of calcium and sulphur, 4.3 per cent; potassium and other salts, 11 per cent; insoluble woody fiber, 8.6 per cent. The nuts are collected every four months, and transported, if possible, by water, when rafts are made of the nuts themselves, having simply a netting around them to keep them from separating, the owner riding on top.

Benne seed (*Sesamum indicum* L.) has been known in the Orient from the most remote times and is to-day cultivated in all tropical countries. The seeds of this plant contain as much as 53 per cent of fixed oil, which is somewhat similar to olive oil and is often mixed with the latter to adulterate it. It has a sweet taste, although more insipid than olive oil, and becomes rancid very slowly. In Egypt, Japan, and other countries it is used in cooking in place of lard or olive oil. It is excellent for making soap, and is also employed as a cosmetic and in the preparation of medicinal emulsions. The residue left after the extraction of the oil is used as a fertilizer, and is also an excellent food for fattening cattle. Of that cultivated in the archipelago but a small quantity is exported.

Lumbang (*Aleurites triloba* Bl.) is cultivated for the oil, which is extracted from its seeds. This oil is of good quality, is used for illuminating purposes and for calking ships, and is an excellent substitute for linseed oil in the preparation of pigments. It is exported to China. The castor-oil bean (*Ricinus communis* L.) is grown in the Philippines, and its seeds produce about 40 per cent of their weight in oil, which is used as medicine. A reddish oil, very useful for illuminating, is also extracted from the seeds of a tree (*Jatropha curcas*) and which bears different names in different parts of the archipelago.

The peanut is a native of Lower Guinea, from whence it was carried to Brazil, and is now cultivated in all America, the southern part of Europe, Asia, and Oceania. In the Philippines it is cultivated on a small scale, but chiefly as forage for cattle. If the cultivation, however, is carefully conducted, the seed will yield half its weight in an oil, which the natives often mix with cacao in the manufacture of chocolate.

The nutmeg grows without cultivation in Cebú and in the Province of Laguna, and under culture will flourish in all parts of the islands. In the Dutch East Indies, where the cultivation of the nutmeg has received the greatest attention, the plant or tree attains to a height of 40 feet. The trunk is covered with a thin, dark bark, slightly mottled in appearance, and when cut exudes a red juice which coagulates on coming in contact with the air. The fruit in size resembles a small peach, having a thick husk and a hard pit about the size of an almond within which the nutmeg is formed. This is enveloped in an aromatic skin or membrane known to commerce as mace. From the beautiful flowers of the tree, which are aromatic, the natives make a preserve which is noted for its fragrance.

The cinnamon tree is also native to the Philippines, being found in abundance in Mindanao. In Zamboanga, Caraga, and in the mountain districts of Misamis varieties of cinnamon of stronger taste and fragrance than that of Ceylon are found, although it contains a bitter element which depreciates its value, but this might be eliminated by cultivation. The cinnamon of commerce is the outer bark which has been stripped from the young branches. Pepper also is produced in many parts of the archipelago, but little is exported, as sufficient attention has not been paid to it to enable the Philippine product to compete with that raised in other parts of the East Indies.

Indigo and other dye plants.

Among the dye-producing plants, indigo, a native of India, holds an important place. The juice extracted from its leaves and young stalks furnishes the well-known dye so much used in the industries. Indigo is produced in Bataán,

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Batangás, Bulacán, Laguna, Pangasinán, Pampanga, Zambales, and Ilocos Norte and Sur. The plant has small, slender, round leaves, whose tips are colored, and produces little, slender pods full of seeds. Although the plant grows in temperate climates, two or three crops a year may be obtained in warm, moist regions as against one in temperate zones. The most suitable ground for the cultivation of the indigo is that having light, deep soil, as the roots of the plant ramify but little, the central long root penetrating deeply into the soil. The land should be free from trees, so that the sun's rays are not obstructed, for under such conditions the juice of the leaves and young stems is more abundant. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit appears. The indigo in the leaves is without color and in solution. When the juice is extracted from the plant it is yellowish in color, but on being exposed to the air it changes successively to yellowish green, green, greenish blue, and finally becoming insoluble, it falls as a blue precipitate to the bottom of the vessel, about thirty hours after the extraction of the juice.

The sappan also furnishes from its woody trunk a coloring matter similar to campeachy or logwood, which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found which produce a color more highly valued than that of the Brazil woods. It is an important article of export to China and England, the former country using it in dyeing silks, damask, and other fabrics woven in China.

The safflower, or lazar, is a plant of the family *Compositæ*, called also "bastard saffron," and in the Philippines "biri." It is valued and cultivated for its stamens, which contain three principal coloring matters—two yellow, soluble in water, and of little value, and the third red, soluble in alkalis and of greater importance. It is used in the adulteration of saffron.

The natives extract dyes from various other species of wood. From the bark of the tree called "bagalibas" a dye is obtained, which will give cloth a fine tawny color. The prepared bark of the tree called "dayagao" makes a fine mordant, which imparts a luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hagur are much used by fishermen for dyeing and strengthening their nets, which take on a dark-brown color, and are rendered less susceptible to rotting.

Mongo.

Leguminous plants are of but little importance in the Philippines. One exception is the commonly cultivated mongo (*Phaseolus mungo* Linn.), smaller than the lentil, but of the same flavor, which is cultivated on a large scale, it being the principal food of many towns. The butingui is the true kidney bean, and is found in considerable variety in Philippine gardens. The zabache is also highly prized, and the sitao produces a vegetable about a foot long. The patani and the frijol from Abra are also appreciated and cultivated.

Sweet potato.

Although the origin of the sweet potato (*Ipomœa bataas* L.) has been much discussed, it is believed to have come from Mexico, and this tuber is greatly favored by the mountain races of the islands, which seems to indicate the antiquity of its introduction. The plant grows in five or six months, extending its shoots in all directions, completely covering the soil with its abundant leaves, which are also edible. Where the ground is given over to the exclusive cultivation of this plant, it is allowed to take root in all directions, and as the roots extend and grow the tubers continually, they may be dug up for use at any time. The potato (*Solanum tuberosum* L.) has not done well in the Philippines and is only cultivated with success in certain elevated localities such as Benguet.

Cassava.

The cassava is a native of tropical countries, whose roots contain an abundance of starchy fecula known as tapioca, whose good qualities are well known. In the Antilles, where it is known as yucca, it is cultivated with great care. The yucca or camoting cahoy, as it is called in the Philippines, grows well in both temperate and hot regions.

The plant is multiplied by means of buds growing from the knots on the woody trunk. The roots attain a considerable size, and while they are still

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fresh they contain a milky juice which is poisonous, but this disappears upon boiling or upon exposure to the air for twenty-four hours, leaving the residue of the milky juice quite inoffensive.

In order to utilize the root as food it is necessary to grate it, wash it, and subject it to a considerable pressure to express the juice, and the material remaining after these operations is the flour, or tapioca.

Arrowroot.

Arrowroot, known in the Philippines as tagbac-tagbac, is also a producer of starchy fecula, sometimes called sago. It is an herbaceous plant growing about 1 meter in height, having lanceolate leaves about 15 centimeters in length, similar to those of the banana plant. The part of the stalk underground gradually diminishes in size, to the point of insertion, into a long, horizontal, fleshy, white tuber, which contains a considerable quantity of fecula.

Buri.

The buri (*Corypha umbraculifera* L.) is celebrated all over the archipelago, giving name to the island of Burias, where it is abundant. It belongs to the palm family, growing to a considerable height, is very beautiful, the trunk being adorned with an extended bunch of leaves that are green in color, though the young ones are white. It grows spontaneously in all parts, the natives never planting or cultivating. The leaves are very large, and extend from a single base in the form of a fan. It does not produce fruit until many years old and, like the century plant, after fruiting shrivels and dies. The fruit grows in bunches from the top of the tree, but is not edible. To obtain the starch, the tree is cut down at the root, and all the soft interior part of the trunk is taken out and placed while moist in casks or troughs, while some of the bitter substances are drained from it. It is then pounded with mallets, and the starch separates in the form of very fine grains. This is dried and made into flour, which serves as food, and may be purchased in the markets of the larger towns and is known to commerce as sago.

Bagsang.

There is also a palm (*Metroxylon rumphii Mart.*), locally called bagsang, which is common in the Visayan Islands, growing along the banks of rivers and in other moist regions, which provides food when there is a scarcity of rice. To utilize this product the tree is cut down and stripped of its bark, which is called boje, and which has many uses. The heart of the tree is then cut into strips, which are dried over a fire and saved for future use. When needed it is pounded in wooden mortars to a sort of a flour and made into cakes or fritters, which when eaten with cocoanut milk are both toothsome and healthful.

Fiber plants.

Among the fiber-producing plants mention has already been made of the hemp, which furnishes the largest single item of export and affords employment to thousands of agricultural laborers.

Cotton.

Cotton is cultivated in the provinces of Ilocos Sur and Ilocos Norte, Unión, Pangasinán, and Abra. The species cultivated are *Gossypium herbaceum*, *G. perenne*, and *Ceiba pentandra*. They are, respectively, herbs, bushes, and trees. The first is the only one which is really cultivated and whose product is used in the manufacture of cloth. The others are found growing wild, their cotton being used only for making pillows and mattresses.

Pineapple.

The pineapple, which is cultivated for its delicious fruit, also furnishes a fiber which is obtained from the leaf. The pineapple has about the same geographical distribution as coffee. It requires an even temperature and will grow on almost any sort of soil. In the West Indies it is cultivated for the fruit,

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but in the Philippines it is more valuable as a textile plant. The leaves are cut off when they attain full size, and then scraped with a sharp instrument in order to separate the fleshy part from the fiber. The latter is then washed, dried in the sun, and combed out. It is classified into four grades, according to its fineness, and is employed in the manufacture of fabrics. The finer filaments are woven in very rough looms into a most delicate cloth, called "piña," which commands a high price and is highly prized in the Philippines.

Ramie.

Ramie probably had its origin in Java, Sumatra, or the southern part of China. It is a nettle, but without needles, and is cultivated for its fiber, which, like flax, is formed on the outer part or bark of the plant. In spite of the excellent quality of this fiber, cultivation has not increased, on account of the difficulty of extraction, which can only be done at a profit with special machinery. In the Philippines it is found in the Batanes Islands and in the northern part of Luzon.

Agave or Century Plant.

The agave, or century plant, whose original home was America, is cultivated on a small scale in certain localities in the Philippines. Its fleshy, sharp leaves, bordered with a row of spines, furnish a long, strong fiber from which a delicate cloth is woven.

Rattan.

Rattan of the genus Calamus is represented by several species called by the natives "dilan," "yantoc," "talola," "curag," and "palasan." These spiny climbing plants, which sometimes attain a length of 600 feet, furnish the natives with a useful material of most extended application. All the framework of the houses built of bamboo and nipa, and many of those built of wood. are held together by strongly laced bands of this material. These rattans, called "bejuco," are also employed in the rigging of all the smaller boats and in the making of rafts, etc. In some of the provinces hats and sacks are made from the rattan and in other places chairs and other articles of furniture. With plenty of bamboo, rattan, and a bolo, a native can fence his farm and build and furnish his house.

Bamboo.

There are few plants in the islands more important than bamboo. There are a number of species, but the most useful is the Cauayang totoo, which at times reaches a diameter of more than 20 centimeters and a height of more than 12 meters. It is employed chiefly in the construction of native houses, which are often made wholly of bamboo, with the exception of the rattan used to tie it together and the cogon or nipa used as thatch. The posts, floor, rafters, and doors are all of bamboo, which the natives employ with great skill. Either entire or split into stripes, it is used in the construction of boats, rafts, bridges, aqueducts, scaffolding of all kinds, baskets, furniture, fishing apparatus, arms, rope, etc. This plant, together with the cocoanut tree, the nipa palm, and the rattan are truly providential for these countries.

Garden plants.

Although the natives do not care much for the cultivation of garden plants, they are found near the large centers of population, being generally cultivated by Chinese and the products sold to Europeans. Among those cultivated are onions, garlic, asparagus, radishes, cabbages, artichokes, endives, peppers, tomatoes, carrots, celery, parsley, and the haras (*Fœniculum vulgare*), a native plant whose fruit contains seeds having a sweet flavor similar to anise. Of the family of curcurbitacæ there are also a large number of plants, among which are the common squash, of which there are several varieties. The genus *Cucumis* is represented by four species, one of which, called the "Tobacog" (*Cucumis melo*), is a true melon; but, while possessing a delightful aroma, never reaches the excellent flavor of the American melon. Cucumbers are also raised, and in Laguna the strawberry occurs.

The bureau of agriculture has been active in the work of distributing field and garden seeds, and during the season of 1902 nearly 20,000 packages, including

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134 varieties, were distributed to the farmers and gardeners of the archipelago, with simple yet explicit directions as to planting and cultivating. Steps are being taken also to introduce from the United States and other countries small orchard fruits, and in the more elevated regions efforts will be made to grow the fruits of the Temperate Zone.

The recent discovery on the island of Negros of a native species of grape suggests the possibility of a line of fruit growing which has never been attempted. This wild grape, with great resistance to humidity and heat, possessing great productiveness and robust habits, may prove of inestimable value for the ultimate development of a race of grapes adapted to the islands and suitable either for the table or for the manufacture of wine.

Fruits.

Little attention has been given to the cultivation of fruit in the Philippines, but both the wild and cultivated varieties are abundant and will, under intelligent direction, be very much improved. One of the most highly prized fruits is the mango, which grows well in Luzon and in the Visayas. The fruit has a delicate flavor and an aromatic odor, the largest of them being fully 6 inches in length. In shape they are somewhat oval and flattened, the skin is smooth and yellow, and the pit, which lies in the center of the fruit, is almost as long as the fruit itself, but very thin. The leaves are long and wide, and an infusion of these is something like tea. There are a number of varieties of this delicious fruit. The other fruits worthy of mention are the following:

Anona reticulata L., the anona, an exotic from Mexico, its flesh being white, sweet, and fragrant.

A. squamosa L., called "ates," a juicy, aromatic, sweet fruit that seems to melt in the mouth. It is of American origin.

Diospyros discolor Willd, called "mabolo," whose reddish fruit is of a strong odor and about the size of a quince and whose wood is capable of taking a magnificent polish.

Garvinia mangostana L. This is an exotic, and grows only in the southern part of the archipelago and is called the "king's fruit," because so highly prized by the Moro sultans.

There are quite a number of other fruits aside from oranges, lemons, limes, bananas, guayabos, sapotes, for which no English names have been found, and the native names afford but little information concerning them.

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[From report of the Philippine Commission, 1902, p. 302.]

AGRICULTURAL OPPORTUNITIES IN THE PHILIPPINES.

It is hardly necessary here to discuss the agricultural opportunities offered in these islands to corporations or individuals possessing large capital and able to cultivate upon an extensive scale such crops as sugar, hemp, and tobacco. But a small part of the soil capable of producing these crops to advantage is at present under cultivation. The methods of extracting sugar now used leave approximately 50 per cent of the sugar in the pressed cane when it is thrown on the dump pile. Hemp is cultivated in a haphazard way, where it is not allowed to grow practically wild, and the fiber is extracted by hand. No systematic and sustained effort has ever been made to improve the quality of Philippine tobacco, and the methods used in curing it are very primitive. If rich returns have been realized from the growing of these commodities in the past upon a comparatively limited scale, the results of extensive cultivation with modern methods and machinery are too evident to require discussion.

I desire to call especial attention to the opportunities here afforded young men of comparatively limited means to engage profitably in agriculture.

There are very large areas of government lands admirably adapted to the cultivation of cocoanuts. Cocoanut trees come to bearing in from five to seven years, reaching the bearing stage more slowly as the altitude increases. The trees can be grown readily and with comparatively little danger of loss. Under existing conditions, the minimum annual profit from a fairly good bearing tree is $1 Mexican, and frequently two or three times this amount is realized. The ground under the trees is now either allowed to grow up with brush or is kept clear by hand. The growth of underbrush injures the soil and leads to the loss of falling nuts, while clearing by hand is quite expensive. The use of mowing machines would result in a great saving in the cost of labor necessary to keep the ground clear and gather the nuts. Other crops, such as Indian corn and alfalfa, can be grown between the rows of cocoanut trees while the latter are maturing, and used to fatten hogs, which always bring a good price in the Philippine market. The demand for copra in these islands is greatly in excess of the supply and is steadily increasing, while cocoanut oil now sells readily in Manila at $1.25 Mexican per gallon.

The lands along the coast of Mindanao and Paragua are particularly favorable to cocoanut growing, and in the latter island trees are said to come to bearing in four years.

Mr. Lyon, the expert tropical agriculturist of the agricultural bureau, informs me that in no other country has he seen climate and soil so favorable to cacao growing as in Mindanao. The cacao now produced in that island is of superior quality and is nearly all bought up for shipment to Spain, where it brings an especially high price. There are numerous other regions in the islands where cacao can be raised to great advantage, but it is hardly too much to say that there is not to-day a cacao plantation in the archipelago, the Filipinos having almost invariably contented themselves with planting a few scattering bushes, which are left practically without care, to be swamped by brush and preyed upon by insects. Proper harvesting and curing methods are not employed. The fruits are torn from the bushes, injuring the bark and leaving the way open for the attacks of injurious insect pests.

An especially fine coffee is grown in the mountain regions of Benguet and Bontoc and in the Province of Lepanto. The bushes yield heavy crops and the unhulled coffee at present sells readily in Manila at $35 Mexican per cavan, for consumption in these islands or for shipment to Spain. Coffee bushes come to bearing in Benguet in three years. There is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to his health.

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It is almost impossible to secure in Manila the milk needed by the sick. Fresh milk sells for 75 cents Mexican per wine quart. A dairy on the outskirts of the city, with 95 animals, including several bulls, was netting $5,000 Mexican per month when the animals were attacked by rinderpest.

During the first eight months of 1902 there were cleared through the customhouse 14,071 head of cattle, valued at $406,113 United States currency, and for the same period there were imported fresh meats, such as beef, mutton, and pork, to the amount of 846,901 pounds, valued at $47,906 United States currency. At this rate we are importing into Manila fresh meat to the value of $609,664 per annum, exclusive of that used by the Army and Navy.

Native cattle are at present worth $30 to $50 Mexican per head in Manila, and native grass-fed beef sells for 40 to 60 cents Mexican per pound. The pastures of Benguet, Lepanto, and Bontoc afford one vast well-watered cattle range, where there is little doubt that improved breeds of horned cattle could be successfully introduced, while in the lowlands there are vast stretches of grazing lands suitable for raising cattle and carabaos. The latter are at present worth $150 to $300 Mexican per head in the Manila market. Properly conducted cattle ranches will certainly yield very handsome returns.

The present cholera epidemic is believed to have been due to infected vegetables imported from China. The Chinese system of manuring growing vegetables is such as to make vegetables from that country always a source of danger to the public health, and it is important that we should have our own truck farms as soon as possible. As already stated, experience has shown that a considerable variety of vegetables can be successfully grown in the lowlands from improved American seed, and such vegetables command a ready sale at a high price in the larger cities.

Excellent native oranges are produced in the Province of Batangas, in the Calamianes Islands, and elsewhere. The trees, which are often large and vigorous, seldom receive any care, nor has any systematic effort been made to improve the quality of the fruit, which sells readily at a good price. There is every reason to believe that improved citrus fruits can be successfully introduced.

Numerous new industries, such as the raising of vanilla in the lowlands and the cultivation of fruits and vegetables peculiar to the Temperate Zone in Benguet, ought, if properly conducted, to result profitably. Communication between Benguet and Manila is at present slow and unsatisfactory. Great difficulty has been experienced in constructing a carriage road from Baguio, the capital of the province, to Pozorubio, in the Province of Pangasinan, from which point there is a highway to Dagupan, but a good horse trail will probably be completed over the 12 miles of unfinished road within four or five months, and fairly quick communication can then be had with Manila by way of Dagupan and the railway.

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[From Report of the Philippine Commission, 1903, Part 1, beginning on p. 731.]

AGRICULTURAL CONDITIONS IN THE PROVINCES.

Page 731. Province of Abra, Juan Villamor, provincial governor.—Principal industries of the province, cattle and timber. Principal agricultural industries, tobacco for export, rice and corn for home consumption. Eighty per cent of the carabaos and cattle killed by rinderpest. Five per cent of the land of the province under cultivation.

Recommendations.—(1) That 10,000 piculs of rice be shipped in and sold to the people at cost. (2) That 300 carabaos also be shipped in and disposed of in the same way. (3) Opening of wagon road joining Abra and Ilocos Sur. (4) Enactment of a law granting free timber licenses to the poor.

Page 735. Province of Albay, A. U. Betts, provincial governor.—Province peaceful and prosperous. Principal industry, hemp. Exports last year, 50,000 piculs; returns from same, $12,500,000 local currency. Average price of bull carts per day, $40 local currency. Average price of a carromata, $25 per day. Exports of ilang-ilang, $500,000. Exports of copra, $300,000. Produced of sinamay, $3,250,000. Exports of same, $1,000,000. All hemp laborers work on shares, half and half. Seven hundred and twenty thousand dollars a year has been saved by constructing a wagon road to the coast and by adopting modern wheels on the traffic vehicles. Traction engines have been brought in to convey hemp to the coast and rice to the interior. Four hundred bicycles and numerous automobiles have also been imported. Prices of ordinary labor per day, $1 to $1.50, local currency. Hemp-press workers average $2 per day. Carpenters and masons average $2.50 per day. Longshoremen average from $3 to $7 per day. Beneficiador of hemp lates and two members of family average from $8 to $10 per day. Price of labor has risen several hundred per cent and rents have increased 300 per cent.

Page 741. Province of Ambos Camarines, James Ross, civil governor.—Peace prevails; principal product is hemp; export of hemp, 251,969 piculs; other exports are ilang-ilang and copra; planters have turned from rice production to hemp; demand for labor is greater than the supply. There is a great boom in opening up new hemp lands, with constantly increasing demands for labor, and wages steadily increasing; day near at hand when all labor will be taken up and further expansion necessarily cease. Other products of the province are rice, corn, coffee, cacao, sugar cane, cotton, cocoa, and copra. There are practically no carabaos left. Province covers 1,000 square miles and has 135 miles of road, of which 15 are in good condition, balance poor; would cost $400,000 to repair; good roads greatly needed.

Page 749. Province of Antique, A. Salazar, provincial governor.—Population of the province 114,000; principal resource, agriculture; principal crop is rice, with which can feed whole province; average product, 1,500,000 cavanes; sugar cane formerly raised in quantities, but war and lack of work animals caused practical abandonment. Since 1901 great quantities of hemp have been planted. Other crops are copra, coffee, and cocoa. There are not 200 head of cattle left in the province, and the horses are now dying from surra. There are no passable roads in the province, and they are greatly needed. Peace and good order prevail. Despite lack of animals, fields are cultivated and the farmers always reap their just rewards.

Page 755. Province of Bataan, J. H. Goldman, provincial governor.—Main resources of province are agriculture, fishing, and timber. Principal products are rice and sugar. Two-thirds of the rice fields are planted. Twenty per cent of sugar lands are planted. The loss of acreage in both caused by lack of work animals and locusts. No want reported in this province.

Page 756. Province of Batangas, Simeon Luz, provincial governor.—Source of wealth is agriculture, which is completely depressed. Ninety per cent of the draft animals were lost by rinderpest. Money needed to restock province. Need agricultural loan and mortgage banks. Rice and sugar are the principal crops, together with some hemp.

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Page 759. Province of Benguet, William F. Pack, provincial governor.—Best roads in province were but trails; now have 200 miles of good roads. Paid road builders 40 cents per day and up. Six hundred and ninety-two people died of cholera. New houses, new rice fields, and new coffee plantations throughout province. All pueblos in good financial condition.

Page 760. Province of Bohol, Aniceto Clarin, provincial governor.—Agriculture is prostrated on account of calamities of rinderpest, locusts, and cholera. Condition in the province precarious, but people not yet needy. Not over 30 per cent of the ordinary crops will be harvested. Need work animals; also new bridges and roads.

Page 766. Province of Bulacan, Pablo Tecson, provincial governor.—Commerce and industry beginning to flourish. Cholera, locusts, drought, and lack of work animals reported. Agriculture the sole source of wealth. Fifty to 60 per cent of animals dead. Need agricultural banks to establish agriculture. "Usurers exploit the people."

Page 769. Province of Cagayan, G. Gonzaga, provincial governor.—Province peaceful and tranquil. Rinderpest has kept up for years throughout the province. Have also suffered from smallpox, locusts, and cholera. Tobacco prices low. Recommends agricultural banks and capital.

Page 774. Province of Capiz, S. Jugo Vidal, provincial governor—Ninety per cent of the carabaos are dead. Also suffer from cholera and surra.

Page 780. Province of Cavite, D. C. Shanks, provincial governor.—Principal crops are rice and hemp. There are many new plantations of hemp. Roads are bad; and have suffered from locusts.

Page 792. Province of Cebu, Juan Climaco, provincial governor.—Province exclusively devoted to agriculture. Much sugar, on a small scale. Tobacco crop about the same as formerly. Roads are bad; and have suffered from cholera and rinderpest. All crops except hemp and copra decreased on account of rinderpest. Sugar production fell off 75 per cent.

Page 814. Province of Ilocos Norte, Julio Agoaoli, provincial governor.—Have suffered from rinderpest and locusts. Roads are poor.

Page 818. Province of Ilocos Sur, M. Crisologo, provincial governor.—Agriculture looking up after war, and suffering from rinderpest. Animals are increasing. Principal products are rice, sugar, maguey, and indigo. Rice crop is fair. Sugar crop good. Maguey increasing and indigo decreasing.

Page 821. Province of Iloilo, Martin Delgado, provincial governor.—Condition critical. Suffering from rinderpest and cholera. Seven-tenths of the land is unplanted. Desires government to purchase rice and carabaos.

Page 825. Province of Isabela, Francisco Dichoso, provincial governor.—Suffered from locusts. Roads very bad.

Page 827. Province of La Laguna, Juan Cailles, provincial governor.—Roads are bad, but agriculture is prospering as never before. Have suffered from rinderpest. Cocoanuts are the principal product. Natives plant great areas. Natives make $3 a day gathering cocoanuts, for which they receive $1 per 1,000.

Page 829. Province of Union, J. Ortega, provincial governor.—Agriculture suffering greatly, especially rice. Production reduced 60 per cent. Causes: Cholera, drought, and scarcity of animals. Tobacco plantings small, owing to drought. No assistance asked for.

Page 833. Province of Lepanto-Bontoc, William Dinwiddie, provincial governor.—Rice is the great product. No depression reported.

Page 836. Province of Leyte, J. H. Grant, provincial governor.—Hemp is the big crop. It requires the least labor and yields greatest return. Seventy-five per cent of the carabaos are dead. No suffering. Roads and bridges bad.

Page 853. Province of Masbate, Bonifacio Serrano, provincial governor.—Cutting timber is the principal business. Large increase in planting hemp and cocoanuts. Recommends repair of roads and construction of telephone lines.

Page 856. Province of Mindoro, R. S. Offley, provincial governor.—Needs roads and telephone lines. No suffering reported.

Page 858. Province of Misamis, Manuel Corrales, provincial governor.—Nothing reported.

Page 862. Province of Nueva Ecija, Epifanio de los Santos Cristobal, provincial governor.—Agriculture prostrated by reason of rinderpest, locusts, and worms. Roads are bad. Recommends construction of telephone lines and schoolhouses.

Page 864. Province of Nueva Vizcaya, L. E. Bennett, provincial governor.—Needs roads. Agriculture is the principal occupation. Chief industry is rice. Almost impossible to hire men by day wages. When they can, they work for

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natives at 20 cents Mexican per day and food; 40 cents without food to foreigners. Produce all their needs except clothing, for which they exchange rice. Clothing costs about 2 pesos a month; food, 3 pesos. Rice and tobacco principal products.

Page 871. Province of Occidental Negros, L. Locsin Rama, provincial governor.—Agriculture is the principal occupation. Sugar, rice, corn, tobacco, and hemp are principal products. Wages on public works, 40 cents per day Mexican. Need roads. Suffering from despotic reign of usury. Sugar and rice greatly decreased. Corn and hemp increasing. Indispensable necessity is agricultural banks to loan capital at reasonable rate. Suffering from cholera.

Page 890. Province of Oriental Negros, Demetrio Larena, provincial governor.—Roads are poor. Seventy per cent of carabaos lost by rinderpest. Suffered from drought. For above reasons and fall in prices of sugar and increase in laborers' wages many sugar plantations suspended work. Cultivation of hemp has maintained the province. Hemp exports greatly increasing. Hemp exports as follows:

	Piculs.
1898	37,000 to 40,000
1899	40,000 to 50,000
1900	50,000 to 60,000

Great enthusiasm in planting hemp. Ninety per cent of planters abandoned other crops for it. Great future for province predicted.

Page 894. Province of Pampanga, C. Joven, provincial governor.—Conditions more favorable than ever before.

Page 900. Province of Pangasinan, M. Favila, provincial governor.—Rinderpest carried away 50 per cent of stock. Suffered from locusts. Rice harvest is greater than in the preceding year. Principal products rice, cocoanuts, and salt. Roads are passable.

Page 901. Province of Paragua, William A. Phillips, provincial governor.—Reports that they have not had cholera.

Page 902. Province of Rizal, A. Dancel, provincial governor.—Have suffered from rinderpest and need carabaos. Locusts devastated fields.

Page 905. Province of Romblon, Francisco P. Sanz, provincial governor.—All pueblos increased planting of cocoanuts, hemp, rice, and corn. Large stores of rice on hand. Have built good wagon roads. Have suffered from cholera. Requests a steam launch and a high school.

Page 906. Province of Samar, Julio Llorente, provincial governor.—Principal products are rice, corn, potatoes, etc. No danger of famine. Everyone has money, owing to high price of hemp. No laborers are to be had; all work at hemp. Wages, 1½ to 2 pesos per day. One man works 2 arrobas of hemp (50 lbs.) per day, and gets one-half. Worth $4 Mexican per arroba; thus laborers get $4 per day. All want to work at hemp. Hemp and copra are the chief articles of commerce. Hemp exports, 164,500 piculs. Copra exports, 72,000 piculs. Roads are bad.

Page 915. Province of Sorsogon, B. Monreal, provincial governor.—Financial condition could not be better, although agriculture is prostrate, owing to cholera and rinderpest. "But, thank God, most of the pueblos of the province, being hemp producing, support themselves by commerce and are not in a destitute condition."

Page 921. Province of Surigao, Prudencio Garcia, provincial governor.—Suffered from rinderpest and cholera. Rice crop, 60 per cent of the usual crop; recommends schoolhouses.

Page 922. Province of Tarlac, Alfonso Ramos, provincial governor.—Much depression. Principal products cotton. Principal industries, forestry and agriculture. Herds devastated by rinderpest. Have suffered from cholera. Recommends agricultural banks, work animals, and the use of forests for agricultural purposes and dredging of rivers.

Page 925. Province of Tayabas, H. H. Bandholtz, provincial governor.—Have suffered from cholera. Principal product is copra; second, hemp. Ninety per cent of carabaos died. Labor very scarce. Laborers receive 50 cents a day and subsistence. Carpenters receive $2 per day.

Page 932. Province of Zambales, Potenciano Lesaca, provincial governor.—Suffered from rinderpest, cholera, and locusts. Province much depressed. Principal avocation, agriculture and cattle raising. Rice principal agricultural product. Recommends carabaos and seed.

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[From Report of the Philippine Commission, 1905, vol. 2, p. 448.]

VEGETABLE GARDENING AND TRUCK FARMING IN THE PHILIPPINES.

As the result of three years' experiments on the different stations of the bureau, and from the study of data obtained from several hundred individual planters in the various parts of the archipelago, the bureau has arrived at definite conclusions as to vegetable growing and truck farming in these islands.

While our experiments have been progressing, investigations along similar lines have been undertaken by the government of the tropical French colonies of Indo-China, and it is of interest to note in their reports a general concurrence of the results obtained here. There, as here, the dry, cooler season is the time when the best general success may be expected with most exotic vegetables, and especially with those derived from far northern latitudes.

Our conclusions are derived from experiments conducted at elevations running from the sea level up to 300 meters, a range that probably covers three-quarters of the arable lands and most populous farming districts in the archipelago.

When, as will be noted further on, some vegetables are described as failures it will be understood to mean their behavior within the limits named. This will also include varieties of a yield so insufficient and quality so inferior as not to reimburse the gardener for the seed and labor invested.

At higher altitudes conditions are so modified that many vegetables flourish there which either fail or give partly negative results in the lowlands.

At great altitudes the same planting season must be observed in order to avoid the heavy summer rainfall and the frequent destruction of seeds and seedlings which occurs when summer plantings are made. Planting at the proper season makes available the high mountain plateaus of northern Luzon and central Mindanao for potatoes, onions, cauliflower, spinach, and garden peas, which, grown at sea level, at best are but qualified as failures.

The above are products peculiarly attractive to the commercial grower as they will endure long transit without serious deterioration.

As soon as reasonably cheap and rapid transportation facilities are afforded to seaport towns or interior centers of population the truck industry in those regions can hardly prove other than a remunerative enterprise.

Notwithstanding the general planting restrictions imposed, we can fortunately record a few vegetables that flourish during all seasons. Foremost among these is indisputably okra (gumbo), which never fails to respond with its abundant and wholesome fruits at all seasons and in all localities.

In successive order of suitability for planting at all times comes eggplant, pepper, radish, beans of several kinds, lettuce, endive, mustard, beets, carrots, and sweet corn.

Those succeeding in the dry cool season include, of course, the foregoing, and also embrace asparagus, tomatoes, turnips, cabbage, squash, peas, spinach, onions, parsley cucumbers, and celery as tops, and in rarely favored localities muskmelons and watermelons. Cauliflower, kohlrabi, kale, brussel sprouts, rhubarb, salsify, parsnips, leeks, chives, and French artichokes, though still the subject of investigation, have so far failed. While cool, dry-season planting is giving the best results it must, for many vegetables, be supplemented with irrigation.

It may happen (as in 1904) that the rainfall in December is sufficient to mature many vegetables, but in general that month, with a mean precipitation of only 58 mm. at Manila, must, for the west coast, be classed with the succeeding four as a dry month.

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October, with a normal mean rainfall of 195.1 mm., and November, with 138.2, give assurance of the frequent gentle showers, which conduce to a good start of everything planted at that time.

With December also comes a marked decline in the temperature to a daily mean of 77.4° F. from the 83.9° that prevails in May. The contrast between the actual mean monthly minima is still more sharply defined, being only 65.3° F. for December and rising to 73° F. in May.

This analysis serves to illustrate that what we call our cool, dry season corresponds more nearly to the climatic conditions that prevail during the growing and fruiting season in countries where our best garden vegetables have originated, and that in theory, as in practice, this is the most acceptable time for planting.

For vegetables of tardy development, such as cabbage, tomatoes, onions, and most of the root crops that require three to five months to arrive at maturity, early October planting is necessary for best success.

Radishes, lettuce, squash, beans, and cucumbers, which mature their fruits in from three to six weeks from seeding, may be sown for successive crops continuously from October 1 to March 1. Peas and spinach also develop with marked rapidity, but are so sensitive to the influence of a slight increase of temperature that at sea level they may only be sown in November and December in order to fruit them in January and February, when the mean temperature is the lowest.

There are, nevertheless, many factors in vegetable growing other than climatic which call for the undivided attention of the cultivator.

There are some plants that will stoutly resist protracted heat and drought, but quickly succumb to insect pests; others, of like endurance and unsusceptible to ordinary insect attack, that will soon yield to disease. General immunity from these enemies strongly commends to the grower okra, eggplant, peppers, asparagus, radish, lettuce, endive, mustard, spinach, and carrots.

In the winter season nearly all beans (pole, Lima, and snap varieties) are more or less subject to the attack of mildew, although it must be said that they are more easily controlled by dusting with flowers of sulphur than in temperate climates.

Early (October) sown beets are generally sure to make a good crop; late sowings are mostly subject to the attack of a leaf miner. Sweet corn sown as a wet-season crop most times escapes the attacks of cutworms, but on the other hand is always exposed to the risk of lodgment during heavy storms.

Cabbages invariably are attacked by both cutworms and a true cabbage worm. These must be kept down by hand picking and frequent dusting with Paris green in the earlier stages of growth.

Given early planting, heavy manuring, irrigation, good tilth, and unremitting warfare against worms, cabbage growing at sea level may be made a profitable feature of truck growing. Pumpkins, squashes, cucumbers, water and muskmelons are subject in their early stages to the ravage of a small spotted squash beetle, and call for like vigilance in the use of Paris green.

An intelligent Japanese collaborator of the bureau in Pampanga claims to have secured entire immunity from the attacks of these beetles by sprinkling the seedlings with finely chopped wild grass. As the plants grow he renews the application every few days, covering only to an extent to prevent smothering. When the plants finally emerge from the mulch they are strong enough to resist the attack of the insect. The remedy is simple and certainly worthy of trial.

Cucumbers and all kinds of melons are extremely subject to a wilt disease that often annihilates them at the moment of greatest promise. Our experience with melons has not been promising, but a number of correspondents report excellent success on thin sandy soils that are slightly shaded with such sparse-leaved plants as the spiny acacia or the madre de cacao.

Tomatoes are an erratic crop. Excellent reports have been received from some quarters, but market gardens along the Pasig, which in 1904 produced enormous crops, were this year almost barren, and like experiences were not uncommon in other localities.

A root borer was prolific of much injury to the plantings made by the bureau, but its attacks were insufficient to explain the variability in bearing over the archipelago.

Below, in tabular form, is given a list of 24 exotic vegetables that have been cultivated in these islands, and the rating of each is given in relation to immu-

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nity from disease, insects, and excess or scarcity of moisture, 100 representing the maximum of excellence:

Okra	100	Beets	70
Endive	90	Celery	70
Radish	90	Sweet corn	60
Lettuce	90	Tomatoes	60
Eggplant	90	Spinach	60
Pepper	90	Cabbage	50
Mustard	90	Turnips	40
Asparagus	80	Peas	30
Beans, pole	80	Onions	20
Carrots	80	Cucumber	20
Squash	80	Watermelon	10
Beans, bush	70	Muskmelon	10

It must be remembered that this table is based upon normal averages over many parts of the archipelago, and is not affected by the occasional report of big returns from crops numbered 12 to 18, inclusive.

It will be seen that planting in the numerical order given in the table is apt to give the grower the best all-around results.

From this it also appears that the first 7 varieties may be planted by the truck farmer with a strong assurance of profit, the next 12 with more or less chances of success, and the final 5 with but little, if any, encouragement.

To the truck grower whose garden is remote from market a slow crop maturity is sometimes advantageous, as the keeping quality of the products is increased. Quality, however, is always impaired, and the aim of the near-by grower should be to secure the tenderness so appreciated in all salad and root crops.

To this end abundant manuring, plenty of water, and frequent tillage are required. For most garden truck the soil can hardly be too heavily enriched with stable manure, and further fortified at the time of planting with ammonia salts, oil cake, or any of the substitutes that abound in nitrogen.

Before concluding, attention is invited to a few of our native vegetables which merit cultivation by truck gardeners who especially cater to the tastes of American and European consumers.

Some of these, in point of crop assurance and freedom from disease, are not only entitled to first place in our select list, but are enormously productive and subject to still further increase under good management.

Some of the native vegetables have a distinct bitter flavor, which in general does not appeal to the foreign palate. On the other hand we have:

Squash.—The dark-green native calabasa, which in sweetness and prolific bearing is unsurpassed by any foreign introduction.

Patani (a species of phaseolus).—Has most of the qualities of a good Lima bean, with the single drawback that the outer integument of the seed is somewhat tougher than that of the improved Lima. This, too, is quite unrivaled in productiveness, the writer knowing a single vine that supplied a family of three persons with a good mess on alternate days for a period extending over six months.

Seguidillas (or asparagus pea).—Produces an excellent and abundant pod, which, like okra, in order to be appreciated must be taken only when young and tender.

Sincamás (pachyrrizus).—May be eaten raw, or, when boiled, makes a good substitute for turnips.

A number of native wild sweet potatoes, such as *Tugui* and *Nami*, when carefully prepared are not inferior to the finest yams cultivated in the southern United States.

It is quite certain that further acquaintance with these native vegetables will stimulate a demand for them, and that their culture on a commercial scale will prove remunerative.

Very respectfully,

WM. S. LYON,
Horticulturist.

The CHIEF, BUREAU OF AGRICULTURE,
Manila.

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CULTIVATION AND PRODUCTION OF SUGAR AND TOBACCO.

[From hearings before the Committee on Ways and Means, House of Representatives, January 23–28 and February 3, 1905, page 267.]

FINAL STATEMENT BY HON. WILLIAM H. TAFT, SECRETARY OF WAR.

WAR DEPARTMENT,
Washington, January 31, 1905.

SIR: I venture to submit to you a summary of the reasons why, in the judgment of this Department, the bill introduced by Mr. Curtis (H. R. 17752) should pass.

First. Whatever ultimately will be done with the Philippine Islands, they are necessarily for the next generation to be a part of the United States, and the people of the United States are trustees in holding the Philippine Islands for the benefit of the people of those islands and are under a sacred obligation to treat the people of the islands as their wards. With this relation between the United States and the islands there is no more reason for a tariff against the introduction of the products of the islands into the United States than there is for a tariff on the products of Alaska, or the Hawaiian Islands, or Porto Rico, or, indeed, of New Mexico and Arizona.

Second. Under the Spanish régime the Philippine Islands were granted a differential of approximately 3 cents a pound on sugar introduced from the Philippines into Spain, and advantage of that amount of duty over the importations of sugar from all non-Spanish parts of the world.

With respect to tobacco, the Spanish Government maintained a monopoly in the manufacture and sale of tobacco, and took all of its supply from Cuba and the Philippine Islands. Since that time, as I am informed, the Spanish Government has purchased its tobacco where it could find it cheapest, and the Philippine markets have not necessarily been given the benefit of the Spanish patronage. The change of sovereignty, therefore, has taken away from the tobacco growers and manufacturers of the Philippine Islands, and the sugar growers of those islands, the monopoly of the valuable market of Spain. The United States is under an obligation to make this deficiency good. In addition to this there has been imposed a heavier tax on tobacco and sugar in Japan and in Australia, which has much reduced the opportunities for profitable sale of both products.

Third. The Congress of the United States has enacted a law by which, after the 1st of July, 1906, all merchandise from the Philippine Islands carried to the United States directly or indirectly must come in American bottoms. Unless Congress by its law shall make the markets in the United States peculiarly profitable, and shall take down all tariff obstruction to the passage of merchandise from the Philippines to the United States, this law is a most unjust law. It can not be assumed that Congress in treating the Philippine Islands for purposes of the patronage of American ships as part of the United States, and thus imposing a burden on the commerce of the Philippine Islands, will now deny the corresponding and necessary benefit of free commercial relations.

Fourth. Congress has, for the benefit of the farmers, laborers, and cordage manufacturers of this country, repealed the export tax imposed by the laws of the Philippine Islands on manila hemp exported directly from the islands to the United States, and thus reduced the revenues of the islands, which otherwise would have been raised there during the enforcement of this act, $1,051,000 at the end of the fiscal year 1904. It should be said that in order to make up the deficit caused by this appropriation of the revenues of the islands for the

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benefit of American labor and farm and business interests a provision was made by which all duties collected on imports from the Philippine Islands and paid into the Treasury of the United States should be turned over to the treasury of the Philippine Islands, but this was insufficient to meet the drain on the revenues of the Philippines, so that the net loss sustained by the insular revenues on account of the repeal of the export tax on hemp during the three years was $329,000 at the end of the last fiscal year. Except for the fact that Congress regarded the Philippine Islands as part of the United States and felt justified, because of other benefits which it proposed to extend to those islands, in aiding particular classes of its own citizens in this country, such legislation would be unjust and improper. We are not pressing at this time a bill which shall permit all the products of the Philippine Islands to enter without the payment of any duty whatever. If we were to admit into the United States all products of the Philippine Islands free of duty, the reciprocal obligation on the part of the islands to admit merchandise from the United States free of duty would probably arise, and merchandise from the United States could not be admitted free under the treaty of Paris without extending the same privilege to merchants from Spain until the year 1909, a condition which would too seriously impair the customs revenue of the islands. By 1909, however, we hope to have an internal-revenue tax so adjusted that the loss in customs revenues on goods coming from the United States may be offset by the internal revenue.

Sixth. This House once passed a bill reducing the tariff on sugar and tobacco of the Philippines to 25 per cent. The bill passed without great opposition. There was no particular opposition because a consultation of the statistics showed that there need not be any. It was only after the opposition, which we have now seen has been nursed by paid professional agents, who have circulated unfounded statements among the trade, and have misled many persons not familiar with the facts, to enter a protest. The minute that these statements are carefully examined the portentious prophecies of enormous stimulated production of sugar and tobacco in the Philippine Islands and a destruction of the tobacco and sugar interests in the United States are seen to be only the product of timorous imaginations and to rest on no credible evidence whatever.

We are, however, now met with the decided opposition to this bill by the representatives of all the sugar and tobacco interests of this country, with the exception of a very important part of the country in the production of sugar—Hawaii and Porto Rico. The argument is that the reduction in the duty effected by this bill will so stimulate the production of sugar and tobacco in the Philippine Islands that the sugar and tobacco markets of this country will be swamped with the Philippine products, prices will be reduced, and the Louisiana cane-sugar interests, the beet-sugar interests, the leaf-tobacco growers, and the cigar makers of the country will all be disastrously affected.

With respect to these claims it is first to be observed that no one, not even an editor of the tobacco and sugar journals (and I can not state the matter any more emphatically) claims that the present production of the Philippine Islands, either in sugar or in tobacco or cigars, would have any appreciable effect if admitted into this market at the prices at which they would be admitted under the new bill. Even the lively imagination of a journalistic advocate of these interests could not rise to the point of claiming that in a market, the demand for which requires the admission of 1,800,000 tons of sugar for the yearly consumption of the people of the United States, the admission at any price of 83,000 tons of sugar, which was last year the production in the Philippine Islands, could affect in the slightest degree the market price of sugar in the markets of the United States. Nor could they claim that the introduction into the United States of the total exports of tobacco filler leaf and smoking tobacco, amounting to 19,000,000 pounds, could have the slightest effect to reduce the price of tobacco on filler leaf and smoking tobacco in the United States, where 164,000,000 pounds of filler leaf are consumed, 600,000,000 pounds of tobacco are produced, and 300,000,000 pounds thereof are exported, or that the introduction into the country of 105,000,000 cigars could influence a market consuming 7,000,000,000 cigars like that of the United States. The whole proposition of the opponents of this bill, therefore, must rest on the conjecture as to what the Philippines would be likely to produce under a reduction of the tariff from 75 per cent of the Dingley rates to 25 per cent of the Dingley rates. Now, let us consider what this reduction means in sugar, and what it means in tobacco.

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Sugar.

First. No sugar is now imported into this country from the Philippines. Two or three cargoes were sent as an experiment, but they resulted in a heavy loss to their owners. They were called "cargoes in distress."

Second. This country is now using 2,700,000 tons of sugar, of which 1,200,000 tons from Cuba pays 80 per cent of the Dingley rate of duty, 600,000 tons from other foreign countries pays 100 per cent of the Dingley rates, and 900,000 tons are raised in Hawaii, Porto Rico, and the United States proper. It follows that as long as the United States demand creates the need for importation of the supply of 600,000 tons or any part of it from the rest of the world, the price of raw sugar in the markets of the United States will be regulated by the price at which foreign sugars can be sold after paying the full Dingley rates, and that after such foreign importation shall cease the price of raw sugar in the United States will be regulated by the price at which Cuban sugar can be delivered in the United States after paying 80 per cent duty. It follows that no supply to the markets of the United States at any cost and at any duty, however low, from the Philippines, will or can affect the price of raw sugar in the United States until both foreign and Cuban importations cease.

If the price of sugar in the markets of the United States is not affected by Philippine importations, then the domestic producers are not in the slightest degree affected to their prejudice. It follows, therefore, that until the domestic production of sugar and the Philippine importation combined shall increase the supply of the United States by more than 1,800,000 tons the price will not be affected either by the Philippine or the domestic production. As the growth in the United States demand for sugar from year to year is considerably greater than the increase in domestic production of sugar, it follows necessarily that the Philippine importation into the United States must increase from nothing, as it now is, to 1,800,000 tons to sustain the contention of the opposition.

Third. The only motive which the present bill will furnish for the increase in the present production of sugar in the Philippine Islands so as to lead to an importation from the Philippines into the United States of 1,800,000 tons is the reduction in the duty from 75 per cent of the Dingley tariff on sugar to 25 per cent of that tariff. The 75 per cent tariff on sugar that polarizes even higher than the sugar usually imported from the Philippines is eighty-eight one-hundredths of a cent a pound. Twenty-five per cent of the Dingley rate on same sugar is twenty-nine one-hundredths of a cent. In other words, this bill under discussion proposes a reduction in duty of fifty-nine hundredths of a cent a pound on Philippine sugar. It is then for the opponents of this bill to establish that if Philippine sugar could be laid down in New York fifty-nine one-hundreths of a cent less a pound than now, at least 1,800,000 tons of Philippine sugar would come into this market and displace the foreign and Cuban sugars and stop their importation.

Fourth. This is impossible. For the last four years the importation of Philippine sugars to all countries has not averaged 100,000 tons, and last year it did not exceed 84,000 tons. Willett & Gray, sugar-trade publishers, predict that this year the exportations will reach 140,000 tons, but this is wholly conjectural and probably erroneous, because Mr. Colton, the collector of customs at Iloilo, the sugar port of the islands, says the exportation this year will show a falling off, and probably not exceed 65,000 tons. But 140,000 tons admittedly will have no effect on this market. The greatest amount ever exported from the islands, and that was at a time when sugar was at a much higher price, was 264,000 tons in 1893. The price of sugar in Iloilo to-day is $3.50 a picul of 137½ pounds (see Governor Wright's telegram), or 2.54 cents a pound laid down in New York; the freight is 0.24 cent and the insurance is 0.08 cent, or a total of 2.86 cents; add present duty of 0.88 cent makes a total of 3.74 cents.

The proposition of the opponents of the bill is that if this cost of laying down in New York was 3.15 cents, or about 19 per cent less than at present, which would be the effect of the present bill, the importation from the Philippines, which is now nothing, would increase to 1,800,000 tons, and the total production of the island, which is now less than 100,000 tons, would increase to at least 1,800,000 tons, or 1,700 per cent.

Fifth. This is absurd on the face of it. Much is made of the low cost of producing sugar in the Philippines. The best evidence, that of Señor Luzuriaga, of Negros, a large sugar planter, one of the foremost Filipinos of to-day, a clear-headed business man, testifying in another issue than the one before us, says (see Phil. Com. Report, 1903, vol. 1, pp. 182–184; see appendix hereto)

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that to-day in the Philippines the immediate outlay in the planting and cutting of cane, the preparing of the sugar, and laying it down at Iloilo is 1.25 cents a pound, this without including anything for depreciation in plant, any profit, any interest on loans, or any rent for the land. Add to this 0.24 cent freight to New York, 0.08 insurance, and 0.88 cent duty, and the cost, without profit or interest or rent or allowance for depreciation of plant, or laying it down in New York, under the present tariff, is 2.45 cents, and yet not a ton comes here, though the price in New York ranges from 3.38 cents to nearly 4 cents a pound. This, of course, shows that reckoning in profit and other charges needed to induce the production and importation, the price at which the sugar can be laid down in New York is in excess of 3.38 cents, and the claim that the cost of production is less than 1 cent is wholly unfounded. Rent must be a substantial element in the cost, because first-class sugar land is worth in the islands from $20 to $40 an acre (see evidence as to Friars' land in Phil. Com. Report, 1903, appendix to civil governor's report; see appendix hereto). Interest on agricultural loans in the Philippines ranges from 20 to 35 per cent annually.

Sixth. The opponents of the bill say that there are 50,000,000 acres in the Philippines available for sugar planting that will at once be turned into sugar land with modern machinery, and that it will produce 5 tons an acre. This is "moonshine." The best evidence shows that good sugar land to-day does not average in five years to exceed 1.2 tons of sugar a year, and that with the best and most expensive machinery and methods the best land would not produce more than Cuban lands produce, or 2½ tons to the acre. The acres under cultivation in the islands to-day do not exceed 200,000, if they reach that figure, and probably never in the history of the islands, under the spur of three times the present price of sugar, have the acres of sugar land ever exceeded 400,000. Sugar is raised at a profit for export in three or four provinces, Occidental Negros, Pampanga, Iliolo, and Cebu. It is raised in all the provinces, as it is everywhere in the Tropics, but merely for local consumption and food. In Occidental Negros a large part of the surface is mountainous and unfitted for sugar, and the south one-third is impenetrable forest, impossible to clear in many years. Pampanga has much swamp land in it unsuitable for sugar. The truth is that hemp, copra, and even rice, are more profitable crops and involve much less outlay than sugar, even with the proposed improvement under the present bill. Hemp forms 65 per cent of the exports of the islands, and copra is next. It is the height of absurdity to suppose that even free trade in sugar with the United States would mean more than a merely gradual growth in sugar land and sugar production in the Philippines.

Seventh. The most serious limitation upon the production of sugar and its increase is the limited supply of labor and the necessarily rapid increase in the cost of labor if there is any considerable increase in sugar raising. To-day, even with the small crop, sugar planters have to bring to Negros from the distant island of Bohol, from Antique, and from Capiz one-half their labor supply for the cutting season. The increase in the hemp production increased the price of labor in the hemp fields from 50 centavos to 2, 3, 4, 5, and 6 pesos a day for an adult, and if sugar were to double in product as hemp has, we may expect a similar increase in the cost of sugar labor. It needs no argument to show how impossible under such a restriction an increase in production of 500 per cent is, let alone one of 1,700.

Eighth. Much is made of the investment of American capital in sugar and sugar machinery. In the first place, no corporation can take up or hold more than 2,500 acres of land. This is prohibitory, so far as new investment in sugar plantations is concerned, because the sugar cane produced from such a tract would not justify the investment of the amount needed for a modern sugar plant. A plant necessary for the turning out of 15,000 tons of sugar annually costs $1,000,000. To produce 500,000 tons of sugar in the Philippines there must be an investment of $33,000,000 in plant alone, and to produce 1,700,000 tons it would require, more than $110,000,000, and this does not include the heavy cost of preparing land for cane, which would certainly be $15,000,000 more. Is such an investment to be induced by the prospect of a reduction by this bill of the cost of laying sugar down in the American market at 19 per cent less than it can now be laid down there, when now it can only be laid down in New York at a loss?

Ninth. The sugar of the Philippines would never all of it come to the United States. The natural market for sugar is China. The demand for Philippine sugar in that market is growing. China takes in a mass the "sorted" sugars

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produced in the Philippines, which embrace four grades—one polarizing at 88°, one at 85¼°, one at 80°, and the fourth or wet sugar at 70°. When this sugar comes to the United States it must be graded. If any substantial part of the Philippine sugars were diverted to the American market, the Chinese market would have to go elsewhere and at greater cost for its sugar. Hence China would bid against America just as it does to-day, and the market price of sugar at Iloilo for export to China would probably be what it is to-day, to wit (see evidence of Mr. Willett, of Willett & Gray), the New York price less the cost of freight, insurance, and duty. Certainly the crop of the Philippines would then be divided between the United States and China.

Tobacco.

First. No tobacco of any kind is exported commercially from the Philippine Islands to the United States. No tobacco is raised in the Philippines except leaf adapted either for wrappers or fillers or for smoking tobacco. Six hundred million pounds of tobacco is raised in the United States, of which 300,000,000 is exported. One hundred and sixty-four million pounds of leaf for cigars is consumed in the United States. Not more than 50,000,000 pounds of tobacco is produced in the Philippines, and of this but 19,000,000 pounds is exported. Of these exports a very small amount, say 10 per cent, is wrapper leaf, and the remainder is filler leaf and smoking tobacco. The price for wrapper leaf in Manila per pound is 30 cents. (See Governor Wright's cable.) The duty per pound at 25 per cent of the Dingley rate would be 46 cents, making the cost in New York, without freight or insurance, of 76 cents a pound, a price considerably greater than Connecticut wrapper leaf, which is better leaf than the Philippine wrapper leaf. The price for filler leaf in Manila is 10 cents a pound. (See Governor Wright's cable.) The duty per pound at 25 per cent of the Dingley rate would be 8 cents a pound, or the filler tobacco from the Philippines of the best quality would be 18 cents a pound in New York without freight or insurance, a price several cents higher than filler from Ohio or Pennsylvania or other States. In other words, there is not the slightest danger of wrapper or filler tobacco from the Philippines competing with American filler leaf.

Second. The duty on cigars at 25 per cent of the Dingley rate is $1.125 a pound and 6¼ per cent ad valorem. The "perfecto" cigar made in this country of Sumatra wrapper and Cuban filler by Cuban hand work sells at $120 a thousand, and of this $34 is labor. The same cigar made in this country of Sumatra wrapper and Cuban filler by American hand work is worth $70 a thousand, and the labor is $17 a thousand. The Philippine "perfecto" laid down in New York is worth about $46, and the labor is $6. The Philippine cigar, of course, can not compete with the Cuban cigar and is not in the same class any more than American-made Cuban cigars are in the same class as Cuban-made Cuban cigars. But what is very evident is that by reason of a duty of $1,12½ a pound on the Philippine cigars and 6¼ per cent ad valorem it would be possible for American cigar makers to make cigars out of Philippine tobacco at $17 a thousand of 17 pounds and undersell cigars of the same material made in Manila, and this is true of all the kinds of cigars, "perfectos," "high life," "panatela," or "londres" likely to be imported from the Philippines into this country.

Third. The Philippines only export 105,000,000 cigars to all countries, whereas America alone manufactures 7,000,000,000 cigars. The suggestion that the export from the Philippines could seriously affect the American market is absurd.

Fourth. The tobacco land of the Philippines for export is confined to Isabela, Cagayan, Ilocos Norte, Ilocos Sur, Abra, and Union. Tobacco raised elsewhere is for local consumption only. The two first-named provinces are the important ones. They are sparsely settled, and the labor supply there is very poor. The culture of tobacco is not in the hands of large landowners, but of small farmers, whose care of the plants is not what it should be. (See Governor Gonzaga's report of the tobacco industry.) There is very little hope of great expansion by increase of price, because of lack of labor. The prophecy that coolie labor will be introduced from China is wholly unfounded. The policy of exclusion of the Chinese from the Philippines is the policy of the United States Government, of the Philippine Government, and most important of all, of the Philippine people.

For the considerations above stated I earnestly urge this honorable committee to report favorably the bill under discussion, reducing the duty on sugar and tobacco to 25 per cent of the Dingley tariff. I sincerely hope that the committee

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will not be led, in a spirit of compromise, to a reduction to merely 50 per cent of the Dingley rates. I am confident that a 50 per cent rate would not do the islands the slightest good or result in any appreciable importation of either tobacco or sugar into this market. At one time I hoped it might, but our experience with a reduction of 25 per cent satisfies me that I was mistaken. The only possible good that a 50 per cent rate would do would be to show how ridiculous are the claims of the beet-sugar and tobacco men who have appeared before you as opponents of this bill, and thus to lead you slowly on to tardy justice to the Philippine Islands.

I hope, moreover, that the committee will not be led to hesitate to vote right on this bill and on the showing made here because of a fear or belief that it may not pass the House or Senate for shortness of time. I plead for justice for the Philippines before this leading committee of the House of Representatives and ask a decision on the merits of this bill without regard to the future fate of this particular bill, because your just judgment will be of the greatest weight in every one of the future discussions of the issues presented, to which I propose, as long as through official channels I may properly do so, to invite the continued attention of Congress.

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Very sincerely, yours,

WM. H. TAFT,
Secretary of War.

Hon. SERENO E. PAYNE,
Chairman Committee on Ways and Means,
House of Representatives.

Inclosures.

[From Fourth Annual Report of the Philippine Commission, 1903.]

Testimony taken at Malacañan Palace February 16, 1903, relative to the value of lands owned by the religious orders.

Governor TAFT. Is all this land rice land?

Señor VILLEGAS. No, sir; other crops are grown, such as sugar.

Governor TAFT. How much ought first-class sugar land to produce?

Señor VILLEGAS. From 25 to 30 piloms of sugar to a hectare.

Governor TAFT. How much does second-class sugar land produce?

Señor VILLEGAS. From 16 to 20 piloms.

Archbishop GUIDI. Explain to me why you have valued rice land above sugar-cane land, when it is known that the latter gives a more valuable product.

Señor VILLEGAS. It is because they are higher lands than those of palay.

Archbishop GUIDI. Is it not true that the sugar-cane land gives a greater profit than rice land?

Señor VILLEGAS. No, sir; rice lands give a more valuable crop than sugar.

Governor TAFT. Are the expenses of cultivating sugar greater than the expenses of cultivating rice?

Señor VILLEGAS. Yes, sir.

Governor TAFT. How do they differ; how much?

Señor VILLEGAS. It is slight, but the difference consists in the using of machinery with sugar cane.

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TESTIMONY OF SEÑOR JOSÉ LUZURIAGA, MEMBER OF PHILIPPINE COMMISSION.

Governor TAFT. Señor Luzuriaga, you are a member of the Philippine Commission?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. You are a citizen of the province of Occidental Negros?

Señor LUZURIAGA. Yes, sir; of Bacolod, the capital.

Governor TAFT. You have lived in Occidental Negros, as I understand it, all your life?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. Do you own land in Negros?

Señor LUZURIAGA. Yes, sir; I am the owner of three estates which are devoted principally to the cultivation of sugar cane and also rice.

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Governor TAFT. Are you familiar with the prices of sugar land per hectare in Occidental Negros?

Señor LUZURIAGA. Yes, sir; I can testify on that matter.

Governor TAFT. How far from the sugar market is land in Negros?

Señor LUZURIAGA. The local markets for the sugar grown on the estates in Occidental Negros are situated on the coast of that province. They are Silay, Saravia, Bacolod, Talisay, San Enrique, Bago, and Pontevedra, and, on the southern coast, Ilog, all of which are maritime ports; but from these local markets the sugar is shipped to the central market, which is situated in the town of Iloilo.

Governor TAFT. Is it the habit of the vessels which carry the sugar to beach—come right up on the shore—and take the sugar from the estate directly to Iloilo?

Señor LUZURIAGA. In some cases the lorchas are able to come right up to the estate, but as a general rule the sugar is shipped from the coast itself, where the boats come right up to the coast and are loaded there and take the sugar to Iloilo.

Governor TAFT. How much is the ordinary gross product from a hectare of first-class sugar land?

Señor LUZURIAGA. That depends on the class of lands. Sugar lands are classified into first, second, and third class lands. The product of first-class lands—that is, of the superior lands—is 80 piculs per hectare. But it must be borne in mind that that is the product of a good year. It will not produce that in ordinary years.

Governor TAFT. I would like to ask you generally as to the classification of land. Do they classify land according to the production in the good years, when the conditions are all favorable, or according to the average through favorable and unfavorable years?

Señor LUZURIAGA. As a general rule the classification is made on the basis of five years. It is calculated that in those five years one crop will be an extraordinarily good crop, two years will be ordinary crops, and two years bad crops.

Governor TAFT. When you say first-class land will produce 80 piculs a year, do you mean in a good year?

Señor LUZURIAGA. Yes; I mean in a good year. The two years of average crops would produce about 60 piculs of sugar, and the two bad years I calculate would produce about 25 piculs; that is, on an average.

Archbishop GUIDI. Is it the custom to renew the seeding of the sugar cane every year?

Señor LUZURIAGA. In my estates I have always been accustomed to do so, but in certain parts of Negros, around Isabela, for instance, they do not renew the stalks for three years.

Archbishop GUIDI. Is this land not worth a great deal more?

Señor LUZURIAGA. It was owing to the fact that it was not so expensive to cultivate.

Governor TAFT. How much is sugar land worth to-day that produces 80 piculs in a good year?

Señor LUZURIAGA. That also depends on the quality of the sugar. There are four classes of sugar raised in the island of Negros—first, second, and third class, and the common or ordinary. At the present time they are getting an extraordinarily good price for the sugar. No. 1 sugar is worth in Iloilo as much as $6 a picul. There is a difference of 3 reals between No. 1 and No. 2 sugar, and from No. 2 to No. 3 of 2 reals.

Archbishop GUIDI. I understood you to say that this was an abnormal price paid this year, but from my understanding of the matter, which I have based upon a reading of the newspapers, the reduction of the Dingley tariff will have such an effect on the Philippines with regard to sugar culture that the price of sugar will go still higher.

Señor LUZURIAGA. The opening of the United States market is only one factor in the situation. The price is governed more by supply and demand; it depends altogether on the production of beet sugar in the United States and other places, and the production of cane sugar in Java, Cuba, and other countries.

Archbishop GUIDI. The sugar planters of the Philippines would have this advantage, that they could export their sugar to the United States market without paying any duties, and it would undoubtedly have the effect of raising the value of sugar land in the Philippines.

Governor TAFT. I want to speed the day when sugar can go from these islands into the United States, but the difficulty is that Congress has adjourned without

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passing such a law, and the reduction of 25 per cent on the Dingley law has made no appreciable difference. The prospect of further reducing the Dingley tariff 50 per cent, so the merchants informed me the other day, had the effect of increasing the price of sugar, but with the failure to reduce the tariff the price of sugar, I presume, has fallen.

Archbishop GUIDI. But the fact that Congress has not denied that reduction in the tariff, but simply postponed action upon it, gives me to understand that there is a probability that Congress will in the future grant this reduction. At any rate, it is more reasonable to believe that the reduction will be granted than that it will not be granted.

Governor TAFT. I sincerely concur in that. I believe that Congress will do it at the next session. I shall be very much disappointed if it does not reduce the duties on sugar and tobacco from the Philippines. But this is a little aside from the discussion. I wanted to get at the price of land in the Philippines at the present high price of sugar.

Archbishop GUIDI. The point I wish to make is this: Señor Luzuriaga has said that this was an abnormal and extraordinary price for sugar this year. This extraordinary and abnormal price will in the future be an ordinary price.

Governor TAFT. What is the difference between the price of sugar in Negros and the price in Iloilo?

Señor LUZURIAGA. Fifty cents.

Governor TAFT. So that the price is $5.50 a picul on the land where it is produced?

Señor LUZURIAGA. That was the price in the months of January and February, but now it has lowered a little. At present we can get only $4.60 for No. 1 sugar on the hacienda.

Governor TAFT. Let us take it in round figures, $5 a picul in Negros. Would that mean a hectare would produce 400 pesos a hectare value of the gross product?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. What is that land which makes a gross product of 400 pesos a year in good years worth, as land is sold in Negros, per hectare?

Señor LUZURIAGA. Owing to a very special condition of things down there, that land which produces 400 pesos a year per hectare is to-day worth not one-half of that sum. That is due to the special circumstances down there and the lack of money. It simply involves the principle of supply and demand.

Governor TAFT. Do you know whether there is any greater lack of money in Cavite than in Negros?

Señor LUZURIAGA. I understand there is a great scarcity of money in Cavite Province, so much so that I have been given to understand that one-half of the inhabitants there are engaged in robbing the other half. The lack of money is very much felt in Occidental Negros, and it has had this effect on sugar cultivation, that one-fifth of the land is now devoted to sugar culture that has been devoted two years before.

Archbishop GUIDI. I take it that the present conditions that prevail in the islands are altogether abnormal, and I do not think we can base any argument on these abnormal conditions, because there may be a change any day. Perhaps to-morrow things may regulate themselves, and it is impossible to make any calculations on such an abnormal situation.

Señor LUZURIAGA. The trouble is that we have been living under these abnormal conditions four or five years and we are within them yet.

Governor TAFT. What, as rule, is the price of first-class land in Negros to-day, per hectare?

Señor LUZURIAGA. As a rule, from 100 to 150 Mexican pesos per hectare for first-class land.

Archbishop GUIDI. If these are the prices paid in these abnormal times, what was the land worth during normal times?

Señor LUZURIAGA. About 100 pesos.

Archbishop GUIDI. Do you refer to the land here? Several witnesses have testified that the land was worth 200 pesos.

Señor LUZURIAGA. My remarks applied to the island of Negros. I know a great many estates that are now advertised for sale in Negros. They are simply given away almost.

Governor TAFT. Are there some sold there? Do you judge from the prices actually brought?

Señor LUZURIAGA. Yes, sir.

Governor TAFT. Is your estimate based on that?

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Señor LUZURIAGA. Yes, sir; you can search the records down there and find my statements to be based on sales actually made.

Governor TAFT. And I understand that for the purposes of growing sugar Negros is just as convenient to the sugar market as Cavite—or is that so?

Señor LUZURIAGA. Yes, sir; that is true with regard to the markets, and I doubt whether there are any lands in Cavite that are as fertile and as good for sugar cultivation as in Negros.

Governor TAFT. How is it with reference to Pampanga?

Señor LUZURIAGA. In Pampanga there are no lands that are equal in fertility or in productivity to those in Negros. I have seen some of the land in Pampanga.

Governor TAFT. Is Iloilo as convenient to Negros as Manila to Pampanga?

Señor LUZURIAGA. Yes, sir; the market of Iloilo is only about three hours away.

Governor TAFT. Is the expenses of raising sugar, in proportion to the value of the product, greater or less than that of raising rice?

Señor LUZURIAGA. Proportionately, the expense of cultivating sugar cane is much greater than cultivating palay.

Governor TAFT. What is the comparative expense of the two?

Señor LUZURIAGA. In good times in Negros we could produce 1 picul of sugar at an expense of 3 pesos, Mexican. Now the expenses are very much greater, owing to the fact that the locusts have appeared down there, the cattle have all died, and the cultivation has to be done entirely by hand. The price of labor has also risen.

Governor TAFT. What do you calculate it is now?

Señor LUZURIAGA. All expenses could be covered, I think, approximately, by 4 pesos; that is, including all expenses of placing it in the market.

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SUGAR.

[From census of the Philippine Islands, 1903, v. 4, p. 25.]

SUGAR.

For many years prior to 1887 sugar was the most important commercial product of the Philippines. Since that year, except in 1893, it has ranked second in importance to hemp, the value of its exports not having been exceeded by those of any other commodity, except in 1898, during the five months for which figures are obtainable, tobacco exports were considerably larger, the sugar being only 7.6, while the tobacco was 27.9 per cent of the value of all exports; in 1901 it was exceeded by tobacco by less than one-half of 1 per cent, its percentage of total exports having been 10.4. Its average percentage of all the years for which statistics are given was 34.9.

The quantity of sugar produced annually prior to American occupation was much larger than it has been since. In 1881 over 460,000,000 pounds (208,-805,946 kilograms) were exported, and in 1895 the quantity had risen to over 750,000,000 pounds (341,469,556 kilograms); but in 1899, the year immediately following American occupation, the quantity exported was not quite 190,000,000 pounds, which quantity was not again equaled until 1902, when it reached 217,000,000 pounds.

Sugar culture.

[By Hon. José R. de Luzuriaga, Philippine Commission.]

According to a version accepted in some districts of Luzon and the Visayan Islands, the introduction of the sugar cane into the Philippines is attributed to Chinese immigrants who probably brought it from the island of Formosa, although opinions differ in regard to this particular; it being also said that the purple cane of the Visayan group was brought from Batavia, and that the kind cultivated in Luzon came from Tahiti, the presumption being in the latter case that its introduction was due to the Spanish Government which, at that time, ruled in these islands.

The similarity, however, of the method of cultivation followed here to that in Formosa, when that island formed an integral part of the Chinese Empire, and the fact that in spite of the length of time which has transpired, some Chinese names of certain implements and manufactures used in sugar making in many communities of Luzon and the Visayan group are yet current, suggest that the Chinese must have played some part in the introduction of the sugar industry to these islands, and yet it is not possible to vouch for the exactness of this presumption because of the lack of historical data from a reliable source which would place it in the realm of certainty.

Of the many known species of sugar cane, but six occur at the present time in these islands—the purple, white, red, green, striped, and the black with white rings at the joints. The first named is the most generally cultivated in the Visayan Islands on account of its acknowledged superior properties and the advantages it possesses over all the others mentioned from an agronomic, industrial, and economic standpoint. The white cane, and the green as well, have been grown on a small scale in the group referred to, their cultivation being restricted almost exclusively to some provinces of Luzon and the rural districts near Manila, where a taste for the juice of the cane extracted by chewing the stalk is responsible for a considerable consumption of these species. The striped variety is cultivated in very small quantities, a few specimens occasionally being found mixed in with plantations of the purple, and, lastly, the black is wont to be found in rare instances in a few gardens in isolated clumps near the house, it being raised more as a botanical curiosity than for

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any other purpose, as this variety grows slowly and requires great care for its tardy development, although at maturity it is of extraordinary size with a stalk 2 inches in diameter and from 24 to 30 feet in height. Its juice, which is used as an agreeable or medicinal beverage, is extracted by making an incision in the lower part of the stalk and allowing the sap to drain into a receptacle.

In the Philippines the cane is planted, as a general thing, in high, level ground, sufficiently moist and well worked and prepared. In most plantations the cane is put in during November, December, and January, the same months in which the grinding takes place. In alluvial soils, such as are found in some parts of the island of Negros, planting takes place but once every five, six, seven, or even up to ten years, though the same crops are gathered annually, providing care is taken after the cane is harvested not to injure the stalk, which is allowed to remain in the ground, and in the proper cultivation of the sprouts or shoots newly put forth by it. The plantation must then be worked and the soil must be sufficiently broken up and kept clean of weeds during the first ensuing six months, or until the same is thickly sown.

Cane must be allowed to grow for twelve, thirteen, or fourteen months, according to the soil in which it is planted. On virgin or newly cleared land the period is eighteen months, after which time it must be gathered without delay if it is desired to avoid detriment to the crop.

Philippine sugar is of two kinds, classified according to manufacture and packing—that made in pilones (which includes nearly all from Luzon), and the granulated, which is the kind that has been adopted in the Visayan Islands and in some Luzon plantations.

The pilon is a quantity of sugar generally solidified in a receptacle made of baked clay, which serves as a package, having the form of an inverted cone; it weighs one quintal. The granulated is put up in sacks, or what are known as bayones, made from the leaves of a palm called buri, containing from two and a half to five arrobas of sugar, according to the place from which it comes. The bayon is reenforced by a covering of rattan, the entire package being as marketable as is the pilon, although the latter is practicable so far only as Manila is concerned, while the use of the former package is more general, as it is employed with reference to all sugar exported to the markets of foreign lands.

Sugar manufactured in pilones is, by reason of its quality, classified as first, second, and third grade, while the granulated has a different classification, which is, superior No. 1, No. 2, and No. 3, good current and ordinary current. Superior No. 1 corresponds to Dutch No. 16 and generally contains from 93° to 97° polarization.

Further, the classifying term "assorted sugar" is frequently used in contracts. This applies to a quantity of sugar of superior quality made up of three classes or numbers in the quantitive proportion commonly established by the market.

Except in a very few cases, sugar is generally sold as the crop is being gathered. In addition to sales made by planters in the producing districts, a large part of their sugar is placed in the hands of jobbers, who sell it at a higher price in the markets of Manila, Cebu, and Iloilo, ports that are open to general commerce and, as such, having each a custom-house. At each of these places there are firms engaged in the business of buying and exporting sugar, and they fix the price of that article based on the law of supply and demand as shown by market quotations received from the principal commercial centers of the world. The best prices are paid in Manila, Iloilo, and Cebu, but a large number of planters are obliged to yield to temporary financial distress and sell their product to jobbers on the plantations at a price always detrimental to their best interests.

During a period covering many years, cultivation of the sugar cane remained stationary and was conducted on a very small scale. This was due, in the first place, to the inexperience of most planters who were able to produce sugar only of the current class and of inferior quality; second, to the inferiority of the implements used in the cultivation of the cane and manufacture of the sugar; third, to the defective methods of transportation, which impeded when they did not entirely prevent the flow of trade; and, last, to the lack of freedom and immunities that would help business transactions in the provinces, for which reasons Philippine sugar could not prosper at that time in the markets of the world.

However, in 1855 and the following year, during the Crimean war, which involved England, France, and Russia, there was a rise in the price of sugar,

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which reached $13 and $11, respectively, for a picul of 137½ Spanish pounds. Owing to this incentive the cultivation of cane increased in the provinces of Pampanga, Batangas, and Cavite, in Luzon, and in Cebu, Iloilo, and the island of Negros, in the Visayan group, and at the same time was extended to other provinces, so that in a few years, with the help rendered by the opening of some ports to international commerce, such as Iloilo and Cebu, sugar production in the islands increased fivefold, particularly that of the island of Negros, where it appeared that persons of all classes and conditions had agreed to devote their best energies to the then arduous work of cultivating those lands, the majority of which were heavily covered with timber, there being but a few clearings in the forests where the plow had been used. These pioneer planters were unprovided with sufficient funds, and were exposed to the dangers of swamp fevers and other diseases of like character, which, during the operations of clearing and the first plowing of the land, caused considerable loss of life among their number. But these difficulties were not great enough to discourage them. They had great faith in the future, in view of the valuable assistance lent them by two commercial firms of Iloilo. One of these was the English house of Loney & Co. and the other the American firm of Russell & Sturgis, both of which advanced them money for operating expenses and the purchase of machinery. The advances made were returnable in sugar. Other circumstances that contributed in no small measure to the success of these pioneer planters were cheap labor, an abundance of cattle suitable for plantation work, and the absolute security enjoyed by everyone in the island of Negros at that time as regards person and property.

Under such favorable auspices production naturally increased rapidly, so that the 6,000 tons produced in 1855 were increased to 30,000 in 1860, to 100,000 in 1870, to 180,000 in 1880, and 300,000 in 1893—the largest known production in the Philippines—distributed among the different provinces as follows:

Crop of the year 1893.

Province.	Piculs of sugar.	Province.	Piculs of sugar.
Island of Negros	2,000,000	Bataan	30,000
Pampanga and Tarlac	700,000	La Laguna	30,000
Batangas	650,000	Bohol	20,000
Iloilo and Concepcion	600,000	Tayabas	20,000
Cebu	300,000	Ilocos Norte	20,000
Cavite	180,000	Ilocos Sur	10,000
Capiz	100,000	Nueva Ecija	10,000
Antique	80,000		
Pangasinan	50,000	Total	4,800,000

The following tables, taken from the annual report of the Manila chamber of commerce, compiled by a committee of the same in December, 1901, complete the statistics given for the purpose of demonstrating the importance of the production of sugar in the Philippines:

Exports of sugar from Philippine ports: 1891 to 1901.

[Piculs.]

	1891.	1892.	1893.	1894.	1895.	1896.
Manila City	1,174,374	1,089,054	1,712,054	1,577,523	1,729,665	1,563,277
Cebu	140,200	294,220	271,405	163,172	213,352	123,228
Iloilo	1,357,685	2,571,989	2,203,523	1,369,507	1,754,315	1,984,519
Total	2,672,259	3,955,263	4,186,982	3,110,202	3,697,332	3,671,024

	1897.	1898.	1899.	1900.	1901.
Manila City	918,114	251,169	80,374	404,813	68,523
Cebu	247,110	159,469	210,780	51,936	126,604
Iloilo	2,066,786	2,249,023	1,197,700	540,078	691,261
Total	3,232,010	2,659,661	1,488,854	996,827	886,388

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Exports of sugar to different countries: 1891 to 1901.

[Piculs.]

	1891.	1892.	1893.	1894.	1895.	1896.
Great Britain	731,507	1,181,392	1,577,155	978,719	1,373,438	901,256
United States and Canada	1,604,072	1,505,872	1,291,421	910,155	1,055,237	1,305,828
Continent of Europe	37,394	48,512	69,493	68,666	63,149	55,946
China and Japan	299,286	1,219,487	1,248,913	1,152,662	1,205,513	1,407,994
Total	2,672,259	3,955,263	4,186,982	3,110,202	3,697,332	3,671,024

	1897.	1898.	1899.	1900.	1901.
Great Britain	799,548	675,670	132,792	203,970	
United States and Canada	342,540	520,752	353,680	33,600	81,600
Continent of Europe	28,862	2,887	164,033		
China and Japan	2,061,060	1,660,352	838,349	759,257	804,788
Total	3,232,010	2,859,661	1,488,854	996,827	886,388

As may be seen from the above statistics, exports of sugar from the Philippines reached 4,186,982 piculs in 1893, equivalent to 261,686 tons. If to this be added the amount used for domestic consumption, including that refined at Malabon and Manila, and that used by distilleries in the capital city and the provinces which use current grades of sugar in the making of spirits, we will have a total production of 300,000 tons.

After the period of progress in the cultivation of the sugar cane in the Philippines, which, as has been seen, reached its greatest development in the year 1893, had passed, a decline set in from the year following that mentioned, which continued until 1895, when there was a favorable reaction lasting two seasons. In 1897 the depression set in, from which it has been unable to recover up to the present day. This depression is due to the vicissitudes agriculture has experienced in this country during the past few years, caused first, by the competition of beet sugar in the great centers of consumption; second, by the growth of hemp and cocoanut plantations, which have taken away a considerable number of laborers from sugar estates; third, to the continual fluctuations in the price of sugar brought about by the financial crisis and the rate of exchange that resulted in the failure of many planters; and last, to the war, the rinderpest, the cholera, miasmatic fevers, famine, and the locusts, which brought ruin to many plantations and caused a complete depression in the cultivation of the cane in nearly all of the sugar-producing provinces, the exceptions being Negros Occidental and Negros Oriental, Iloilo, Cebu, Pampanga, Batangas, and La Laguna, where work has been carried on under great difficulty.

Last season's crop has been estimated at some 2,000,000 piculs for the entire archipelago, of which 1,500,000 piculs were produced by Negros Occidental, and the balance by all of the other provinces mentioned. Thanks to extraordinary efforts and at the cost of great sacrifices at the beginning of the present year, good and extensive plantations of cane were made in Negros Occidental, which gave promise of a yield still greater than that of last season, but considering the ravages made of late by the locusts, in spite of the efforts of the Government to exterminate them, it is impossible to estimate at present the amount of next season's crop.

The sugar industry in these islands is considered as the most costly among all those derived from the Philippine soil. To-day it is not possible to consider the establishment of a plantation—commonly called hacienda in this country—without going to great expense in the purchase of land, work cattle, and agricultural implements, and the construction of buildings, installation of the machinery plant, repair shops, and the providing of means of transportation, as well as all other accessories necessary for an undertaking of this character. Besides all this, the expenses of operation, which are high in a plantation of any importance, have to be taken into account, as the number of native agricultural laborers is relatively small and wages are not in proportion to the profits ordinarily derived from the business, especially now that there is so great a depression in agriculture in so far as the cultivation of the cane is concerned.

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Prices of available land vary according to the quality and location from $2 to $2.50 Mexican currency per hectare, approximately 2½ acres.

Cattle and horses used in this country for agricultural and draft purposes are very dear, owing to the dire effects of the rinderpest; but thanks to the measure adopted by the government for the importation of cattle, carabao can be purchased at $70, $81, $93, and $100 Philippine currency per head, according to the terms provided by act 828 of the Philippine Commission.

The price of building lumber has increased threefold, due to the forestry taxes imposed by the government for the cutting of timber on public lands; and lime, brick, and other materials used in the construction of buildings on a sugar plantation have also increased proportionately in price. Last, the laborer, who prior to 1898 earned 20, 25, or 50 cents Mexican currency and subsistence, according to the class of labor performed, now demands twice as much before he will work.

The prices of all articles which go to make up a plantation and enter into the manufacture of the sugar having increased, the financial problem is one very difficult of solution to most planters. A scarcity of money and an absolute dearth of loan companies willing to make advances on agricultural lands and standing crops add to this difficulty to a not inconsiderable degree. Formerly the cost of production of a picul of sugar ready for market did not fall below $1.50 Mexican currency, according to the class of land and distance from nearest provincial market center. Since the war, however, and the train of evils succeeding it that have wrought so much damage to the sugar plantations, operating expenses have considerably increased. It is estimated that at present the cost of producing a picul of sugar ready packed for market is all the way from $2.50 to $3 and even $3.50 Mexican currency, not including the expenses incurred in the destruction of locusts, which at times are great and of themselves may cause a loss in the year's business.

According to data which have been obtained relative to the price of sugar in the markets of Manila, Iloilo, and Cebu, the principal sugar centers in the islands, quotations have fluctuated, as a general rule, between $3 and $5 per picul for superior, $2 and $3 for current, and from $4 to $6 per pilon. The prices paid during 1855, $13; 1856, $11; 1878, $7.50; and $6 at the beginning of the present year, when $8 was paid per pilon sugar, are exceptional. All prices given are in Mexican currency.

From the foregoing data it may be seen that under the auspices of peace, and when backed by the financial help extended in the manner formerly done by such houses as Loney & Co., and Russell & Sturgis, of Iloilo, which lent money and furnished machinery on the crops, the cultivation of the cane made rapid progress during a period of not quite thirty years. During that period some three thousand plantations, large and small, were established. The former were 1,000 hectares and over in extent, while the latter were 200 and under. All these plantations were provided with sugar mills, the majority of which were operated by steam and the balance by hydraulic motors and animal power; some of them were also provided with tramways for the transportation of the cane to the mill and the manufactured product to the ports or market towns.

If the sugar industry has fallen into decay after having reached a high degree of prosperity in these islands, it is undoubtedly because of the overwhelming misfortunes which the planter is unable to withstand, in view of the fact that there are no banking or loan institutions here to which he can turn for relief.

Sugar Making and Manufactures.

Tables 6, 7, 8, and 9 relate to the sugar industry, which is not included in the tables preceding them. These four tables embrace the same items as those for other industries, except cost of materials purchased, which in sugar making as carried on in the Philippines is not ascertainable. In point of fact, the materials entering into sugar production are not purchased. They are almost universally produced by the same establishments or rancherias producing the sugar. Sugar cane, the principal material, compared with which all other materials used in this industry are of merely nominal value, is generally grown on the plantations of the proprietors who own and operate the sugar-making plants. Its cost of production is not reported, because it is unascertainable under existing insular methods of accounting.

With the foregoing explanation in mind, the reader will understand that the amounts reported as capital invested in the sugar industry include the sum of

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investments in both sugar-cane growing and sugar making. The same is true with regard to the number and wages of employees, male and female. There is no separation in these items of mechanical and agricultural operations.

These tables present data, by provinces, relating, first, to all sugar-producing establishments the value of whose product was not less than 1,000 pesos in 1902; second, to such of the establishments as used steam power in their manufacturing branch; third, to such as used water power; and fourth, to those in which hand or animal power was used in pressing the juice from the cane.

It must be remembered that in the sugar-growing sections of the islands there are scores and hundreds of small sugar mills not included in the census, operated by hand or carabao, which produced individually small amounts of sugar of values less than 1,000 pesos, whose aggregate value was undoubtedly large. The sugar produced in these small establishments, as in many of the larger ones, is of a very low grade and would be regarded as totally unfit for use in America.

The tables are brief, and are so plain and simple in their composition as to require little analysis or discussion. Their totals are brought together in the following statement:

Sugar-producing establishments in the Philippine Islands using steam, water, and hand or animal power.

Kind of power used.	Number of establishments.	Capital (pesos).	Average number of wage-earners and total average monthly wages.						Value of products (pesos).
			Total.		Men.		Women.		
			Number.	Wages (pesos).	Number.	Wages (pesos).	Number.	Wages (pesos).	
All kinds	1,075	16,933,495	45,247	388,817	41,938	370,820	3,309	17,997	6,603,006
Steam	528	12,229,547	31,322	265,462	29,313	255,015	2,009	10,447	4,850,043
Water	77	1,532,207	4,001	36,720	3,631	34,596	370	2,124	609,378
Hand or animal	470	3,171,741	9,924	86,635	8,994	81,209	930	5,426	1,143,585

The relative importance of the sugar-producing provinces, as indicated by the value of sugar produced, is shown in the following table, in which the provinces are arranged according to their industrial importance in this respect, the number of establishments and the total and average values of sugar made in each province being given:

Number in order of importance.	Province.	Number of establishments.	Value of product.	
			Total (pesos).	Average per establishment (pesos).
	Philippine Islands	1,075	6,603,006	6,142
1	Negros Occidental	531	4,644,398	8,747
2	Pampanga	194	758,691	3,911
3	Iloilo	62	372,399	6,006
4	Negros Oriental	38	325,611	8,569
5	Cebu	69	149,268	2,163
6	Bulacan	38	83,070	2,186
7	Tarlac	33	*62,206	*1,777
8	Bataan	18	46,520	2,584
9	La Laguna	23	40,551	1,763
10	Cavite	15	27,452	1,830
11	Antique	14	26,018	1,858
12	Batangas	8	16,063	2,008
13	Leyte	9	11,460	1,273
14	Pangasinan	4	8,354	2,089
15	La Union	3	6,600	2,200
16	Misamis	3	6,586	2,195
17	Sorsogon	4	6,350	1,588
18	Rizal	3	6,190	2,063
19	Nueva Ecija	4	5,219	1,305
20	Capiz	2	(*)	(*)

* The total value of product and the average value per establishment in Capiz is included with that in Tarlac to avoid disclosing the operations of individual establishments.

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There were more steam-power sugar plants in the province of Negros Occidental in 1902 than in all other provinces combined, 291 such plants having been in operation in that province out of a total of 528 in the islands. The value of product of these establishments was correspondingly large, having been ₱3,559,041, or 73.4 per cent of the ₱4,850,043 worth of sugar manufactured with the aid of steam machinery.

Pampanga stood next to Negros Occidental with 131 steam-power plants, a number in excess of the combined numbers in all other provinces, except the one above named, which amounted to only 106; and Pampanga also ranked second in value of product of this class of establishments, such value amounting to ₱596,285, or 12.3 per cent of the total.

The remaining 106 steam-power establishments were located as follows: Negros Oriental, 32; Iloilo, 26; Tarlac, 12; Bataan and La Laguna, 10 each; Cebu, 5; Bulacan, 3; Antique, La Union, and Pangasinan, 2 each; Batangas and Leyte, 1 each. The percentages of the total value of steam power produced sugar in these provinces were as follows: Negros Oriental, 6.5; Iloilo, 5.3; Cebu, 0.6; Tarlac, 0.5; La Laguna, 0.4; Bataan, 0.3; Bulacan, 0.2; Antique, La Union, Pangasinan, Batangas, and Leyte combined, 0.4.

In establishments using water power, Negros Occidental again ranked first and Pampanga second, both in the number of such establishments and in the value of their product—the first named having 45 and the second 15 water-power plants out of a total of 77 in all provinces, which produced 83.4 and 8 per cent, respectively, of the total value of sugar manufactured in establishments of this class, which amounted to ₱609,378. The number of water-power establishments in other provinces and their percentages of the total value of sugar made in all such establishments were as follows: Bataan, 8 (4.8); Antique, 3 (1.1); Cavite and Tarlac, 2 establishments each; Bulacan and Cebu, 1 establishment each—the percentage in the four provinces of the total value of production having been 2.7.

In establishments using hand or animal power, of which there were 470 enumerated in the archipelago, Negros Occidental again ranked first, with 195 such establishments. Cebu was second to Negros Occidental, with 63 plants; Pampanga third, with 48; Iloilo fourth, with 36; Bulacan fifth, with 34; and Tarlac sixth, with 19 plants. The remaining 75 establishments were located in 13 provinces, as follows: Cavite and La Laguna, 13 each; Antique, 9; Leyte, 8; Batangas, 7; Negros Oriental, 6; Nueva Ecija and Sorsogon, 4 each; Misamis and Rizal, 3 each; Capiz and Pangasinan, 2 each; La Union, 1.

The total value of the sugar produced in this class of establishments amounted to ₱1,143,585. The percentages of this value produced in the different provinces were as follows: Negros Occidental, 50.5; Cebu, 10.4; Pampanga and Iloilo, 9.9 each; Bulacan, 6.4; Tarlac, 2.9; all other provinces combined, 10.

The following statement shows the number of establishments engaged in the sugar-making industry and in all other manufacturing industries embraced by the nine tables to which the foregoing text relates, together with the value of their products in each province.

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TABLE 6.—*Summary of sugar-producing establishments, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	1,075	[a]16,933,495	[b]45,247	[c]388,817	41,938	370,820	3,309	17,997	6,603,006
2	Antique	14	146,308	608	4,299	396	3,254	212	1,045	26,018
3	Bataan	18	149,660	741	9,730	704	9,481	37	249	46,520
4	Batangas	8	38,362	131	1,770	121	1,698	10	72	16,063
5	Bulacan	38	150,627	633	9,355	587	8,786	246	569	83,070
6	Cavite	15	51,325	194	1,882	176	1,780	18	102	27,[illegible]
7	Cebu	60	538,719	1,155	10,200	1,051	9,114	104	1,086	149,[illegible]
8	Iloilo	62	801,922	2,493	15,111	2,197	13,874	296	1,237	372,399
9	La Laguna	23	171,014	716	8,895	632	8,024	84	871	40,551
10	La Union	3	17,210	65	480	63	450	2	30	6,609
11	Leyte	9	168,500	119	3,051	110	3,002	9	49	11,[illegible]
12	Misamis	3	15,967	57	254	53	244	4	10	6,[illegible]
13	Negros Occidental	531	11,189,150	28,885	215,099	26,574	208,365	2,311	11,734	4,644,[illegible]
14	Negros Oriental	38	919,410	2,123	18,267	2,065	17,978	58	289	325,611
15	Nueva Ecija	4	14,649	24	216	24	216	------	--------	5,219
16	Pampanga	194	2,432,745	6,328	78,969	6,272	78,623	56	346	758,691
17	Pangasinan	4	38,130	149	1,313	149	1,313	------	--------	8,354
18	Rizal	3	1,168	25	615	19	552	6	63	6,190
19	Sorsogon	4	6,464	73	753	73	753	------	--------	6,350
20	Tarlac [d]	35	82,165	728	8,558	672	8,313	56	245	62,206

[a] Not including unreported capital for 2 establishments in Negros Occidental.
[b] Not including unreported employees for 11 establishments in Cebu and 2 in Negros Occidental.
[c] Not including unreported wages for 11 establishments in Cebu and 2 in Negros Occidental.
[d] Two establishments in Capiz are included in Tarlac to avoid disclosing the operations of individual establishments.

TABLE 7.—*Summary of sugar-producing establishments using steam power, the value of whose products amount to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	528	[a]12,229,547	[b]31,322	[c]265,462	29,313	255,015	2,009	10,447	4,850,043
2	Bataan	10	73,766	348	4,510	328	4,369	20	141	17,[illegible]
3	Bulacan	3	29,050	63	801	61	782	2	19	8,[illegible]
4	Cebu	5	116,093	229	762	218	729	11	33	27,[illegible]
5	Iloilo	26	567,472	1,718	10,100	1,489	9,047	229	1,053	279,[illegible]
6	La Laguna	10	111,289	420	5,216	377	4,780	43	436	22,[illegible]
7	Negros Occidental	291	8,382,491	21,108	159,789	19,546	151,944	1,562	7,845	3,559,041
8	Negros Oriental	32	884,761	2,030	17,755	1,974	17,471	56	284	317,[illegible]
9	Pampanga	131	1,896,351	4,806	60,003	4,772	59,763	34	240	596,[illegible]
10	Tarlac	12	45,784	299	3,997	292	3,927	7	70	23,[illegible]
11	All other provinces [d]	8	132,490	301	2,529	256	2,208	45	326	17,953

[a] Not including unreported capital for 1 establishment in Negros Occidental.
[b] Not including unreported number of employees for 2 establishments in Negros Occidental and 1 in Cebu.
[c] Not including unreported wages for 2 establishments in Negros Occidental and 1 establishment in Cebu.
[d] Includes establishments distributed as follows: Antique, 2; Batangas, 1; La Union, 2; Leyte, 1; Pangasinan, 2.

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TABLE 8.—*Summary of sugar-producing establishments using water power, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	77	1,532,207	[a] 4,001	[b] 36,720	3,631	34,596	370	2,124	609,378
2	Antique	3	64,736	149	1,104	104	872	45	232	6,815
3	Bataan	8	75,894	393	5,220	376	5,112	17	108	29,152
4	Negros Occidental	45	1,140,030	2,960	24,227	2,661	22,508	299	1,719	508,290
5	Pampanga	15	211,942	413	5,186	408	5,161	5	25	48,899
6	All other provinces [c]	6	39,605	86	983	82	943	4	40	16,222

[a] Not including unreported number of employees for 1 establishment in Cebu.
[b] Not including unreported wages for 1 establishment in Cebu.
[c] Includes establishments distributed as follows: Bulacan, 1; Cavite, 2; Cebu, 1; Tarlac, 2.

TABLE 9.—*Summary of sugar-producing establishments using hand and animal power, the value of whose products amounted to 1,000 pesos or over in each establishment, by provinces: 1902.*

	Province.	Number of establishments.	Capital, pesos.	Average number of wage-earners and total average monthly wages.						Value of products, pesos.
				Total.		Men.		Women.		
				Number.	Wages, pesos.	Number.	Wages, pesos.	Number.	Wages, pesos.	
1	Philippine Islands	470	[a] 3,171,741	[b] 9,924	[c] 86,635	8,994	81,209	930	5,426	1,143,585
2	Antique	9	48,822	339	1,999	212	1,482	127	517	14,903
3	Batangas	7	28,762	111	1,629	106	1,587	5	42	13,284
4	Bulacan	34	112,828	561	8,379	517	7,829	44	550	73,375
5	Cavite	13	43,425	161	1,570	143	1,468	18	102	18,437
6	Cebu	63	406,626	926	9,438	833	8,385	93	1,053	119,518
7	Iloilo	36	234,450	775	5,011	708	4,827	67	184	112,913
8	La Laguna	13	59,725	296	3,679	255	3,244	41	435	18,051
9	Leyte	8	128,500	108	2,959	99	2,910	9	49	10,460
10	Misamis	3	15,967	57	254	53	244	4	10	6,586
11	Negros Occidental	195	1,666,629	4,817	31,083	4,367	28,913	450	2,170	577,067
12	Negros Oriental	6	34,649	93	512	91	507	2	5	7,905
13	Nueva Ecija	4	14,649	24	216	24	216			5,219
14	Pampanga	48	334,452	1,109	13,780	1,092	13,699	17	81	113,507
5	Sorsogon	4	6,464	73	753	73	753			6,350
16	Rizal	3	1,168	25	615	19	552	6	63	6,190
17	Tarlac	19	16,539	314	3,962	304	3,862	10	100	32,770
18	All other provinces [d]	5	18,086	135	796	98	731	37	65	7,050

[a] Not including unreported capital for 1 establishment in Negros Occidental.
[b] Not including unreported number of employees for 9 establishments in Cebu.
[c] Not including unreported wages for 9 establishments in Cebu.
[d] Includes establishments distributed as follows: Capiz, 2; La Union, 1; Pangasinan, 2.

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[Farmers' Bulletin No. 1.]

A PRIMER ON THE CULTIVATION OF SUGAR CANE.

[By William S. Lyon, 1902.]

LETTER OF TRANSMITTAL.

SIR: I have the honor to transmit herewith, and to recommend for publication as a Farmers' Bulletin, the manuscript of a paper on "The cultivation of sugar cane."

The importance of the sugar industry to these islands can hardly be overstated. At the present time it furnishes all the sugar required for domestic consumption and a surplus for export, which, in 1900, amounted to 143,719,971 pounds, valued at $2,397,144, and, with the exception of hemp, this industry gives employment to more of our rural population than any other branch of agriculture. Diminished cane areas, diminished crops, and diminished profits entail suffering in the rural districts that extends far beyond the landed proprietor or owner of a sugar estate. Abandoned cane fields and idle mills throughout the archipelago indicate a depression of such magnitude as to render it incumbent upon this bureau to do everything in its power to remedy these conditions.

The causes producing the present depression in the sugar industry, other than those resulting from the prevailing financial conditions and excessive rates of interest on mortgage loans, are to be found both upon the farm and in the mill. The present practices plainly indicate a lack of knowledge of certain fundamental principles in cane cultivation, and the purpose of this paper is to place before the cane grower in compact form the elementary information essential to the success which lies within his reach.

Respectfully,

WILLIAM S. LYON,
Expert in Tropical Agriculture.

Prof. F. LAMSON-SCRIBNER,
Chief, Insular Bureau of Agriculture.

INTRODUCTION.

Upon most modern estates the manufacture of sugar is carried on in connection with the growing of the cane, but this is not always the case, and cane growing alone may be profitably followed by those who have no milling plant, but who must deliver their crop to the nearest crushing mill.[a] The conditions for profitable returns are exceptionally favorable upon these islands; the climate can not be surpassed, the cane soils are unequalled, there is abundant water supply, the facilities for transportation by water are unusually good, while the difficulties of land transportation will be quickly overcome by the successful planter. It must be the aim of the cane grower to produce upon a given area the maximum of both tonnage and quality in order to secure the greatest profit. This can only result from a judicious selection of land, both as to location and soil, a careful selection of the most productive varieties of cane, and the highest class of tillage and management of the growing crop.

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[a] This is the general practice in New South Wales, where the numerous holdings are, as a rule, small in area. The cane is purchased from the planters, principally by the Colonial Sugar Refining Company, whose various crushing mills and refineries are fitted with machinery of the most modern character.

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LOCATION OF FARM.

The essential feature for the consideration of the grower who does not design to crush the cane himself lies in the accessibility of his farm to a mill. The measure of this accessibility will be determined entirely by the cost of transportation, which will depend on the condition of existing roads; the cost of construction of new ones, or of tramways; or the availability of waterways for more distant carriage. This last in these islands is so valuable a means of transportation that it can be utilized for the extension of cane growing into regions that otherwise could not be made available.

Most modern sugar mills are now equipped with unloading facilities, and by the aid of special labor-saving contrivances effect the discharge of cars, carts, and boat loads of cane with remarkable ease and celerity. These are all contributory factors to "accessibility" and are, therefore, mentioned in this connection.

The next feature that commands attention in the selection of a sugar-cane farm is the suitability of the soil for the designated purpose. It has been contended that sugar cane can be made profit paying upon any land when the rainfall is sufficient and the other climatic conditions are favorable.

It is also conceded by the many authorities responsible for this contention that there are many requisites necessary to bring unsuitable lands to a state of productivity; and that, except in regions where the needed supplies are cheap and plentiful, it is inexpedient to attempt their reclamation to sugar growing. In the Philippines lands exceptionally well fitted for the growing of sugar cane are so abundant that there seems to be no valid reason for the selection of those that can only be reclaimed to this use by tedious and costly processes.

In determining the suitability of the soil we have, as a matter of first consideration, its physical or mechanical condition.

SOIL CONDITIONS.

With a possible exception of tobacco, there is no staple agricultural crop where the physical condition of the soil plays so important a part as it does in the growing of sugar cane. It is a plant that, by virtue of its great size and rapid growth, not only draws heavily upon the fertility of the soil, but its shallow root system and restricted area for each plant demands that the mechanical condition of the soil be such as to facilitate in every way the full exercise of the root's functions. In all regions and in all sugar-producing countries, a strong, deep, argillaceous, or slightly calcareous soil has always been found best fitted to meet these requirements.

In the sandy, sedimentary, alluvial soils along the seacoast, or in rich mountain valleys, heavily charged with the humus in which the cane rejoices, phenomenal crops are often taken, but for long-continued cropping and with a minimum of restoratives the soils first mentioned are those which have longest stood the crucial test of time.

Such lands as these abound in the archipelago and often extend for miles along the lower and easily cultivated foothills, and these to-day offer more inviting fields of operations than many of the apparently more alluring valley lands along the coast.

The land chosen must not be less than 1 foot in depth, but that will be sufficient, provided the substratum on which it rests is permeable to water. The perfect permeability of the subsoil is a sine qua non for the perfecting of the cane, for stagnant water at the roots is a more dangerous menace to success than long-continued drought. It is this peculiarity that clearly differentiates valley lands suited to cane growing from those adapted to rice, an aquatic grass, whose roots thrive in the same soil as the cane, but which must be underlaid by an impervious subsoil that will retain water throughout the growing season.

Nevertheless, the planter need not be discouraged who finds his shallow top soil underlaid by a formidable bed of clay. In most cases it will be found full of stones, bits of tufa of volcanic scoria, and, unless it lies perfectly level with the water table close to the surface, is at times susceptible to the free and rapid percolation of water.

It is suggested to the prospective cane planter who is unfamiliar with the physical character of the subsoil that he dike a small experimental plot of land, making his dikes as nearly waterproof as possible, and then observe the behavior of the land subsequent to one or two torrential rains, noting the tardiness or rapidity with which the water disappears. If, after a 2-inch rainfall upon

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soil previously wetted through, the water remains standing for more than two or three hours, a complete and comprehensive system of drainage is essential before putting such lands into cane.

SOIL FERTILITY.

Fertile soils can nearly always be assured in what are known as "virgin soils," and such are at present in almost unlimited quantities in these islands. It may seem paradoxical to say that on a narrow sea zone, densely peopled by a race who have been engaged in agriculture for generations, virgin lands are more abundant than in what we call a new country within temperate latitudes. Strictly speaking, such is not the fact, but within the Tropics land that has once been cultivated and then allowed to lapse so quickly reverts to its primitive condition that in a very few years it effects what would require a generation to accomplish in a northern climate and to all practical intents becomes once more virgin land. Such lands are more valuable in some respects than the undisturbed soil of the primeval forests. Their reclamation to cultivation is more cheaply effected, while the rapidity with which the processes of growth and decay progress in the Tropics is assurance of a liberal supply of the humus, the one fertilizing agent of all others most vital to the highest perfection of the sugar cane.

In some tropical forest regions the remains of decaying vegetation are so great that they are sometimes present to an almost injurious excess.

On such soils, as also occasionally upon truly virgin sedimentary river bottoms, the cane develops to a size and with a luxuriance that is phenomenal; yet in this abnormally excited growth it frequently becomes gorged with unassimilated alkaline salts prejudicial to sugar making, difficult to eliminate, and depreciative of the market value of the cane.

But the quasi virgin land that has only the accumulated vegetable detritus of a few years offers a happy medium for the growth of a strong, vigorous cane, rich in the precious saccharine matter that crystallizes freely and that always commands the highest price in the sugar mills of the world. Under the question of soil fertility it is pertinent to inquire if some practical suggestion can not be made whereby the equilibrium of the humus in the soil in relation to its mineral elements may be constantly maintained.

A piece of land by the irrefutable logic of good money returns may have demonstrated its superiority for growing cane; it may teem with the elements of soil fertility, yet in a few years the humus is depleted and the cane and its value rapidly begin to deteriorate. There can be no middle course—the exhausted humus supply must in some way be restored.

Humus, as we know, serves a two-fold purpose—one, purely mechanical in its effects, rendering stiff soils pervious to the aeration and moisture, without which perfect root action can not be maintained; the other, the added fertility which it supplies. It is rich in available nitrogen, without which, and notwithstanding a surfeit of other fertilizing agents in the soil, there can be no successful issue to a cane crop.

The two materials known to common agricultural uses that most nearly approximate humus in their action are stable or barn manures and cotton-seed meal. Both these substances are not only rich in nitrogen, but both, while undergoing decomposition in the soil, exert mechanical influence analogous to that of humus.

In countries where cotton is grown and farm stock housed or corralled one or both of these invaluable agents are easily obtained, and no difficulty is experienced in growing a succession of cane crops and in preserving continuously normal soil conditions. In these islands we are practically excluded from the consideration of either, for cotton is not produced in commercial quantities and, outside of a few large cities, the stall feeding of farm animals is unknown, and consequently the use of barnyard manures is out of the question. In this extremity there is no alternative for the cane grower but to lay down his cane fields every third year to, say, cowpeas, vetches, or some leguminous crop that will compensate for the more direct fertilizers that he is unable to procure. As a result, one-third of his sugar fields will be annually unproductive of sugar. Nevertheless there is little doubt that eventually the farmer will be enriched by the operation. These renovating crops can first of all be partly cut and cured for forage, and will afford assured maintenance for the stock that is an indispensable condition to the profitable working of the farm. Stock so fed, if not immune, will at least be far less susceptible to epi-

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demic diseases than those allowed to roam at large over pastures where the herds have previously been decimated by disease.

In addition, the yard feeding of his cattle will necessarily result in the accumulation of manures that if properly protected from leaching by rains will place at his command one of the best means for maintaining continued productivity. In the end, after the saving of the forage, there still remains the stubble, which, when plowed under, acts as humus, while the deep-rooting legumes have not only subsoiled his land, but have stored up while he slept an abundant supply of the nitrogen in the cheapest available way.

A practice in some places in the islands is for planters to "rest" their cane lands every alternate year. Such rests, it may be remarked, are quite as "tiring" to the land as its continuous production of cane. The rest does not last long enough to restore the growth that would in time renew it, nor is it even fallow plowed, which would at least greatly improve its mechanical condition. The "rest" is simply idleness, productive of ill rather than benefit.

PREPARATION OF THE SOIL.

If the land is what we now understand to be virgin soil, the brush and timber will be cut closely to the ground,[a] any wood required for fuel removed, and the remaining tops and branches, when dry enough, gathered in small heaps and burned. Large fires are to be avoided, as the smoldering embers are apt to ignite and burn out much of the precious humus in the soil. It is on this account maintained that all trash should be removed and burned outside the plantation limits. Nevertheless, if the fires are kept small in size, the loss from this source will be inconsiderable and hardly great enough to compensate for the extra cost of handling or for the potassic salts lost by the removal of the brush from the ground; but, most important of all, the scattering and burning of the brush not only kills and facilitates the subsequent removal of the stumps, but helps to destroy the larvæ of pernicious insects that abound in most forest lands.

The grubbing of the stumps can not be profitably undertaken till the rains have thoroughly wet down the soil, and then small roots are easily taken out with a grub hoe, while larger ones that are well charred may be easily removed by carabao.

It is only the largest stumps that should be left to decay. This process is so rapid in this climate that their early extirpation is an easy matter. Unless of extraordinary density of foliage a few standing forest trees are seldom detrimental to field crops. To this the sugar cane is a notable exception. It rejoices in full, free, and unbroken sunlight at every stage of growth, and the greater its intensity and long continuance the greater the assurance of a good yield of sugar.

BREAKING THE SOIL.

The proper initial preparation of the soil presents probably the gravest difficulty with which the cane planter on these islands must contend. The lack of animals and implements adequate to open up and aerate the soil for all the depth to which it may be traversed by the cane roots is indispensable to success, and further on the only solution of this problem that now seems feasible will be presented. Where the initial preparation of the soil has been thorough there is little subsequent occasion for the use of implements of heavy draft. A few years ago the deep subsoil plow and the turning of the land for a foot or 14 inches was considered essential. Now the investigations of chemistry have demonstrated that the available, i. e., the readily assimilated plant food, is that which lies close to the surface, and that the deep burying of this surface soil and its replacement with elements not yet sufficienty disorganized to serve as plant food contained in the under soil is wasteful of both energy and material. As now understood deep plowing serves only a mechanical purpose and no more than to guarantee porosity and a free aeration of the underlying beds.

The subsoil plow has therefore been generally consigned to the things of the past (except for uses not pertinent to this subject), and it is regrettable to have

[a] The writer has lately observed some interesting experiments in clearing, where the brush was topped at 3 to 4 feet from the ground. The supposition is that, in the process of grubbing, the standing butts can be used as levers for the expeditious and easy eradication of the stumps.

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to recommend its resurrection for some existing conditions in this archipelago. These conditions are mainly found upon the clay cane lands, where for many years the soil has been lightly skimmed with a small plow for a depth of 2 or 3 inches, and at this depth the soil is crusted with a polished, impermeable floor, which is the reverse of what is desired and which must be broken up and pulverized if these lands are to be made remunerative. That they bear unprofitable crops is no cause for surprise. The real cause of surprise is that they produce even half a crop of cane, and that they still do this speaks volumes for the wonderful adaptability of the climate and the remarkable fertility of the land itself. On such lands as these there seems no escape from the operation of the subsoiler, as no other implement will quite penetrate and open up this artificial hardpan. Upon virgin land any good deep-breaking plow will answer, although the modern disk plows that turn a furrow of any desired depth are preferred. In this plow the rotating disk, instead of sliding along the furrow, leaving a compact bottom, releases the farmer forever from the perplexing question of future subsoilings. This disk plow and the double-moldboard plow for the economical building up of beds and opening out drains are the only heavy draft implements required for the cultivation of cane. All subsequent tillage is prosecuted with light-draft disk harrows and cultivators of easy manipulation and should properly be considered under the head of "crop cultivation" rather than that of soil preparation. In stiff soils the disk plow can not be used with less than 3 good American horses or mules, and it is doubtful if it could be well operated in such lands with fewer than 6 carabaos. At this time, when the sugar districts of the islands have been almost depleted of their live stock, it seems inopportune to recommend the doubling up of draft animals by the use of heavy machinery. Still, it should be remembered that these plows throw a furrow slice of 20 to 24 inches and will readily and properly prepare 4 to 5 acres in a day, which is more than 6 carabaos will imperfectly accomplish in the same time with the small plow now in general use.

The question of the application of these useful implements to the preparation of cane lands, therefore, resolves itself into a question of motive power, and to the judgment of the farmer, who must decide if a possibly smaller acreage placed in a perfected condition does not offer greater inducements than a larger acreage illy prepared and fraught with prospects of crop failure.

Under the existing live stock conditions, no other suggestion can be made at this time than that given above of doubling up the available farm animals until the required motive power is secured, and it is recommended with the assurance that the farmer's gains from a smaller, well-handled acreage will more than compensate for the loss of acreage that this concentration of power implies.

In preparing valley land for planting, some provision must be made for times of flood that does not apply to uplands. After the first heavy plowing the land is to be fined down with a good harrowing. If the soil is of free, open texture and handled at the time when still moist but not sticky, the common form of sectional harrow will do good work. If inclined to be cloddy the disk harrow will reduce the soil to the best condition of any tool in common use. The land is then to be laid off in 5-foot beds, the middles between them being opened up with a double-moldboard plow. In valley lands that have been kept in the best condition, it is here that the only occasion should arise for the use of the subsoil plow for the purpose of deeply opening up these middles, which will serve the double purpose of drainage and of supplying soil for the elevation of the beds. The depth or shallowness of these furrows will be governed by the susceptibility of the land to overflow.

In many tropical regions, and in most of the Philippines, the cane beds are only made 3½ to 4 feet apart, but where the highest skill is exercised and upon good soils the 5-foot planting should yield a tonnage equally large and at a great saving of expense in both labor and seed cane.

SELECTION OF SEED CANE.

The cane used for seed should always be well ripened and selected from such stools or "ratoons" as from mill tests show the most sucrose and the highest purity. Careful selection for a few years, and the reservation of a portion of the plantation for nursery purposes, will enable the planter to maintain his seed cane at a high standard of excellence. The varieties used here seem to be confined to the green and yellow sorts, of probable Javanese origin. These canes, though rich in sucrose, are generally small and insufficient in tonnage yield per acre. Further, and whenever there is a steady decrease in size from lack of

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proper cultural methods, the deterioration is accompanied with a relatively greater increase of fiber that, in its turn, represents another loss at the mill. The many useful striped, rose, and purple canes, that have contributed to bring Hawaii to the front as the most prolific and profitable sugar region in the world, have not, so far as can be ascertained, been planted in these islands.[a]

Exhaustive tests have definitely established the fact that the upper two or three feet of the cane—the part least valuable at the mills—is well suited to seed purposes, and that no sugar deterioration has occurred from its long-continued use. These tops can be all used, except the extreme tips, which are sometimes inclined to "arrow."

PLANTING.

As soon as the ground is prepared a shallow furrow or trench is opened down the center of the bed with a double-moldboard plow and the cane laid down in the trench, the end of one piece touching the next throughout the whole row. It is the custom, here and in Hawaii, to cut the cane into single nodes a few inches long and drop them at close intervals in the furrow. Such a practice undoubtedly assures a stand from every joint; but if the land has been brought to a fine condition of tilth and the whole of the cane is in intimate contact with the soil, every joint in the piece should break into bud. It will also be seen that the process is more expeditious and labor saving.

Previous to planting the seed cane should be soaked for two hours in lime water of the strength of 2 pounds of slaked lime to 1 gallon of water. This is recommended for the destruction of the eggs of pernicious insects; but in every instance a rigid scrutiny of the seed cane should always be made, and any piece that has been attacked by borers should be rejected As a remedial measure I would place more faith in a soaking of the cane in well-diluted carbolic acid; but, in view of the fact that the lime dressing furnishes at once to the young plant an always-to-be-desired and necessary element of fertility, this time-honored custom of all countries may be generally adopted.

In this country the trench for planting may be shallow and the soil covered back with a light plow or disk harrow. Where irrigation is not to follow, or where rainfall is so great that the water-carrying capacity of the middles is apt to be overtaxed, all subsequent plowing or tillage should be toward the cane row, with the end in view of having it always above water.

AFTER-TREATMENT.

The cane when planted, if followed by good rains or by irrigation, should begin to sprout within a week of the time it is wetted down, and this is the time when the progressive farmer has recourse to the so-called mineral fertilizers for the increase of crop and the maintenance of soil equilibrium. Aside from the humus and the means of providing for it that has already been discussed, there are two essential ingredients of soil fertility that exist in all rich lands, but upon which the sugar cane makes extraordinary drains, and the application of these in the most available forms not only meets with an assured response in a marked increase of crop, but is a guaranty of a continued state of soil fertility that leaves the farm capital always unimpaired. These ingredients are phosphoric acid and potash, and there are apparently no insuperable obstacles in the way of obtaining either. The former is probably to be had from the many deposits of bat guano that exist in the archipelago, and wherever these deposits are found in caves or have been protected from rain they are almost certain to be rich in this valuable element. If the planter is remote from any such source or from any known phosphate deposits, there seems to be no alternative than its purchase and importation from the Sandwich Islands or the United States.

These salts are more useful in the form of acid phosphates, and are commercially known as "superphosphates" and carry from 10 to 20 per cent of soluble phosphoric acid, and their cost is always based wholly upon the percentage of the acid they carry. In any event the amount required is small (200 to 400 pounds per acre) and at any reasonable cost it should be obtained.

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[a] Through the commendable enterprise of Capt. G. P. Ahern, Chief of the Forestry Bureau, an importation of these Hawaiian canes was recently made to this country, and efforts will be made, by their rapid propagation and further introductions, to effect future distributions of the same to planters. F. L. S.

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The supply of potash does not appear to be of such pressing concern with the cane planter. Not only, if his land has been cleared and burned over, there has been returned a considerable supply of this element, but the indications are that most of the sugar lands of the islands are already rich in potash. Without recourse to a chemical analysis there is a simple, practical test whereby the farmer can determine this question for himself. Let him select two or three or more small plats typical of as many different soils as the farm shows and lay them down for two or three years to different kinds of lucerns and clovers, giving them no manuring whatsoever. If the growth from these plats is luxuriant, and they only suffer from causes directly attributable to long-continued drought, he may reasonably conclude that his land is provided with enough potash to meet all the requirements of cane growing for many years.

In the use of acid phosphates or of bat guano there is a process that is both effective and economical for its application. It may be scattered lightly in the furrow at the time of cane planting; or, if it is used in the form of bat guano, and where it is probably in combination with valuable nitrates, a furrow may be opened close to the cane, and the fertilizer scattered lightly and evenly along both furrow and furrow slice, and then all harrowed down smoothly with a disk harrow. There are drills now in common use that are adjusted to deliver commercial fertilizers directly where required and in precise quantities, but careful hand sowing can be made equally effective.

It should be remembered in the application of manures of this class that they are exceedingly soluble, and the greatest benefit from their use occurs at the time when light showers are prevalent. If applied at the time when the heaviest and long-continued rains are anticipated, a very large proportion of the valuable elements will be leached out of the land and carried away in the middles and drains. For the rest, all the subsequent cultivation to be given until the rows are crowded with suckers, and the cane ready to lay by and ripen, is a constant but superficial stirring of the surface with either hoe or cultivator.

After every rain, or so soon thereafter as the soil will admit of working, this cultivation should never cease. It is the keynote of the successful issue of the crop, and all the careful soil preparation and soil amendments that have been bestowed in previous months are largely nullified if a hard, compact crust is permitted to form and remain upon the surface. When the rows are completely crowded with cane and the ground well shaded, this surface induration will no longer occur, and the planter can await the ripening of his crop with the assurance that every hour of toil expended upon cultivation will be many times repaid.

HARVESTING THE CROP.

When the cane is ripe, and this is easily determined by the cessation of growth and a general deepening in color, it is ready for harvesting. It should be cut very close, or even with the ground in this climate, and the tops and leaves trimmed off, when it is ready for delivery to the mill. The tops are then gathered and buried in trenches of moderately dry soil until required for planting. The leaves and trash are gathered and burned or else covered deeply in a furrow made by a double-moldboard plow and allowed to decay. Both processes have strong advocates among expert sugar growers, but the process to be most commended will depend on circumstances. If there be the slightest evidence of fungous growth or the presence indicated of any sap-sucking or cane-boring insect whatsoever, there is no option. Every vestige of refuse should be burned. If such is not the case and there is, on the other hand, difficulty in obtaining stable manures or other humus-making ingredients, burying the trash will go a long way toward the maintenance of soil fertility, and is the best solution of the question of its disposition.

MANAGEMENT OF STUBBLE.

At one time three-fourths of all the cane grown on these islands was from stubble crops. Now, by long-continued depletion of the land in many districts it has become necessary to lay down the land to new seed cane every year; and this system, despite its wastefulness, seems to be the only one that affords planters any assurance of even a half crop.

Where the lands are not hopelessly exhausted or facilities are at hand for their renovation, there is no excuse for this wasteful policy; and virgin land, or land that is maintained in rotation, should be profitably handled for the second

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or even a third year. The rational method of treating the plantation destined to be carried over a second season as stubble cane would be as follows: In the process of harvesting the soil will be more or less compacted by the trampling of the cane cutters, by the cleaners, and by the carabao used in hauling away the crop. A thorough and deep plowing is therefore once more necessary, and to this must be added a complete forking over of the land in the stubble row itself. This may be effected by hand, although there is a machine now in common use, known as a "stubble digger," which has a revolving, cultivator-toothed attachment that works up the soil effectively and with remarkable speed directly in the row, and, with a little care, rarely tears out a stubble root. From this point on the manurial treatment and cultivation of a stubble crop is a practical repetition of that given to the seed-cane crop. This, in fact, would be the outline indicated for continuous succession of crops were it not for the difficulties that confront the Philippine planter in the procurement of complete fertilizers and which imperatively call for a crop rotation every third year if he would preserve the maximum sugar yield for an indefinite time.

There is no reason why the third or rotation year should be operated at a loss or be given up wholly to soil recuperation. The method practiced in Mauritius, Reunion, and most of the French colonies would doubtless be successful and profitable here. The third year the same stubble is grubbed out, the land laid down as usual, and planted to corn. When this has made fair growth and begins to "tassel" out, the ground is sown broadcast to vetches, cowpeas, or some other quick leguminous soiling crop. A fair to good crop of corn is usually secured, and the leguminous forage is pastured down till the season comes for plowing it under and reseeding the land to cane. This pasturing can only be done without injury during the dry season, and the farmer who turns carabao in to pasture in wet cane lands is inflicting incalculable mischief that will take years of reparative treatment to overcome.

DRAINAGE AND IRRIGATION.

There are two subjects pertinent to the matter under consideration that will be made the subject of future bulletins and that can only be briefly touched upon in this paper. They are drainage and irrigation. The former is indispensable to attaining a maximum of success upon the littoral lowlands of these islands, and ultimately a comprehensive system of drains will control every well-equipped and well-managed plantation in the archipelago. The evil effects of stagnant water have been already pointed out, and the indispensable necessity of deep, broad, middle ditches and laterals for the rapid diversion of storm waters, has been insisted on elsewhere. These middles and laterals, however, are but makeshifts offered for the immediate amelioration of water-logged cane fields until they can be otherwise properly reclaimed. Open drains, to be efficacious, must be constantly kept clean and in repair. This entails constant labor and a very considerable and unnecessary sacrifice of land. Stone-filled drains made of broken stone of graduated sizes are expensive, and in time are apt to become clogged with fine silt. Tile drains will be the final recourse, and the excellence and abundance of the clay and the skill shown by the Filipinos in its manipulation are additional reasons for advocating their use. The financial condition of the planters at this time justifies a recourse to the expedients previously mentioned, and the hope is expressed that the profits arising from a better scheme of can growing may eventually enable them to place their fields in the highest and most profitable condition.

It is well known that a perfect system of tile drainage is almost a guaranty against the evil effects of drought. To those who lack full comprehension of the subject, it appears paradoxical that a system primarily designed to dispose of surplus water in the soil will, at the same time, acts as an agent for its restoration. Such is the case, however, and on the principle that nature abhors a vacuum there can be no evaporation of the surface waters without a supply constantly being drawn from below to replace it. Further, this, like all water that is in motion, is pure, sanitary, and drawn upward through the cane roots in just such quantities as they can appropriate with the greatest benefit, and in dry seasons, unless in excess, never flows to waste in the drains. It is, in short, the auxiliary to the planter in the valley that irrigation is to the cane grower on the uplands.

The uplands promise to be of long-enduring value, and, ultimately, more profitable than the valleys. The abundant water supply that prevails in all the

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districts where sugar is now grown is available for the reclamation of immense areas to this purpose. Here the planter has positive and complete control of the situation. He is free from the ever-recurring possibility in tropical countries of disastrous flood or inundation, while the danger of protracted drought need not be considered as an element of crop failure. His control, in short, is so perfect that he can apply moisture at the times when it is most beneficial and withhold it completely as his crop approaches maturity, when continued rain or moisture would increase the sap in the cane, at the sacrifice and loss of the sucrose he has patiently striven to elaborate.

Large areas of these uplands are frequently quite level, or with a gentle slope toward the sea, and consequently present ideal conditions for the ready distribution of irrigating waters. Some of the most valuable lands are, however, more or less undulating, and although susceptible to irrigation, the successful manipulation of the water requires attention to some simple engineering problems, which are, however, too extensive for treatment at this time.

CONCLUSION.

In conclusion, it may be said that the rational treatment of sugar cane involves that it be forced, and forced constantly, from the day the cane first sprouts till it is ready to lay by and ripen. This forcing process can hardly be overdone, and involves an adequate water and food supply and such constant tillage and forcing as will enable it to assimilate every particle of the food and water given. A check of any kind is fatal to the fullest measure of success, and the cessation of the functions of growth for only a few days means the elaboration of starch and fiber in lieu of the sucrose we are after.

In common with every other form of vegetable life, vigor and luxuriance of growth affords more general immunity from the attacks of predacious insects or fungoid growths and a consequent saving from the losses which these entail.

GROWING SUGAR CANE IN HAWAII.

[Extract from a report on the agricultural resources and capabilities of Hawaii, by William C. Stubbs, Ph. D., published in Bulletin No. 95, United States Department of Agriculture, Office of Experiment Stations.]

The dominant crop in Hawaii is sugar. * * * Few places in the islands where cane can be grown at all will yield less than 30 to 40 tons per acre. * * *

The table-lands surrounding the islands at elevations of from 20 to 500 feet constitute the chief sugar areas. * * * There are about 60 plantations on the islands which yielded in 1898–99 about 300,000 tons of sugar. These plantations have about 100,000 acres in cane, one-half of which is harvested every year. * * * Under irrigation as much as 10½ tons of sugar per acre has been the average of one plantation * * *.

Table showing expenses per ton of sugar grown, and per acre.

Plant cane.	Per ton.	Per acre.
Clearing	$0.54	$5.51
Mule and steam plowing	1.41	14.50
Ditches	.20	2.05
Cutting and hauling seed	.80	8.22
Preparing and planting	.88	9.04
Fertilizing	4.01	41.13
Watering	3.63	37.18
Hoeing and weeding	.76	7.85
Stripping	1.49	15.25
Cutting and hauling cane	3.48	35.62
Pumping expense	2.42	24.84
Sundry accounts (rent, interest, and all other expenses)	5.33	54.63
Manufacture	2.65	27.15
Containers	.99	9.77
Total	28.59	292.74

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Plant cane:

Total yield of cane	tons	117,835
Yield of cane per acre	do	78.9
Purity of juice	per cent	87.07
Amount of cane required to produce 1 ton of sugar	tons	7.71
Total production of sugar	do	15,289.5
Yield sugar per acre	do	10.24

On the leeward side of the islands, where irrigation is practiced, the land is broken with steam plows to a great depth. Rows are laid off at 5-foot intervals with very deep double-moldboard plows. Into these deep furrows the tops of the cane are dropped in a continuous row, the soil is drawn in lightly with hoes and a shallow stream of water sent over the buried tops. In six to seven days a continuous stand of young canes is obtained. For the purpose of economizing water the rows are laid off as nearly on a level as possible, and an open furrow for irrigating is maintained during growth. After each irrigation hoes draw in from the adjoining ridges small quantities of soil in order to conserve the moisture applied. Save irrigation and its incident hoe work, and the threshing of cane no other cultivation is given. A contract is usually made with a head Chinaman to irrigate and thresh the cane, from planting to harvest, at so much per ton of cane harvested. The contract is usually for 100 acres, the company furnishing the water. Contracts are also made by the ton for the cutting and delivery of the cane at the sugarhouse, the company furnishing the cars and engines. The breaking of the land and the planting of the cane is usually done with hired labor.

On the rainy or windward side of the island the conditions require entirely different methods from those just described. The lands are broken in a similar manner, but less deeply, and the tops are planted in an open furrow and covered. When the plants are large enough, the work of cultivation begins, which is usually done with plows, cultivators, and hoes. This cultivation is continued until the canes are sufficiently advanced to "lay by." Every operation is similar to the best practice in the cornfields of the West. Here reliance is placed entirely upon the rainfall for furnishing the needed moisture to canes. Sometimes the rainfall is excessive, at others deficient. Severe and protracted droughts, which occasion great loss to the planters, occur at rare intervals. As a rule, however, the rainfall is ample for good crops, and the extra expense of irrigation is avoided. Hence frequently the windward plantations are just as good dividend payers as the leeward estates, though the yield per acre are much less. Threshing of cane is practiced here as on the leeward side. In both instances the dead leaves are piled up between the rows, where they remain until after harvest, when they are burned. "Rattooning" or "stubbling" is not largely practiced. Only first-year rattoons or stubbles are cultivated. When ever, in the judgment of the manager, these will not produce 30 tons of cane per acre they are plowed up and the land replanted. Just here is one of the secrets of the large success attending sugar growing on these islands. Two-thirds, if not three-fourths, of the area each year is in plant cane. In Cuba, Porto Rico, and other tropical islands cane is permitted to run for six to even sixteen years, with the unavoidable result of annually diminished acre yields and a low average sugar output. Sugar planters elsewhere are disposed to doubt the accuracy of the large published yields of Hawaii. Let them consider their own enormous yields from plant cane and then apply such results to their entire plantations before they begin to question outputs obtained in these islands. It is true that irrigation upon fresh lands, upon the warmer leeward sides, in a climate almost perfect for maximum growth, has greatly increased the average output of Hawaii, but the carrying of the largest portion of the crop as plant cane is unquestionably the main cause of the large yields. This is evident by the yield obtained on the rainy or windward side of the islands, which are much larger than those obtained in Cuba and other tropical countries, even though much below the returns of the irrigated plantations on the lee side of the same islands.

The cane when harvested is delivered to the sugar mills by wagons drawn by oxen or mules, by rail, with horses or steam, by water flumes sometimes crossing deep gulches, and by trolleys. Plantations use either one of the above methods to suit their peculiar environments.

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[From hearings before the Committee on Ways and Means, House of Representatives, January 23–28 and February 3, 1905, page 139.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 27, 1905.

STATEMENT OF COL. C. R. EDWARDS.

* * * * * * *

The next table shows comparatively the exportations of sugar from the Philippine Islands during the calendar years 1865 to 1904 to the United States, to other countries, and the total exports.

The figures pertaining to Spanish administration were compiled from Spanish commercial statistics published from year to year by the Spanish Government. Those for the years of American administration are according to returns of the present customs service at Manila, published in the Monthly Summary of Commerce of the Philippine Islands by the Bureau of Insular Affairs, War Department.

Exportations of sugar from the Philippine Islands during the calendar years 1865–1904.

[Data for years 1865 to 1894 compiled from official returns of the Spanish Government; for 1895 to 1899 from official returns of the United States Agricultural Department; for 1899 to 1904 from official returns of the Insular Bureau.]

Calendar year—	Exported to United States.	Exported to other countries.	Total.
	Tons.	*Tons.*	*Tons.*
1865	12,492	42,685	55,177
1866	13,599	41,237	54,836
1867	11,268	53,292	64,560
1868	14,354	59,727	74,081
1869	29,044	39,765	68,809
1870	23,140	55,073	78,213
1871	40,361	47,104	87,465
1872	32,219	63,307	95,526
1873	35,821	53,516	89,337
1874	51,216	52,645	103,861
1865–1874	263,514	508,351	771,865
1875	53,549	72,650	126,199
1876	78,533	51,898	130,431
1877	64,692	58,094	122,786
1878	63,902	54,081	117,983
1879	56,076	78,729	134,805
1880	100,460	77,495	177,955
1881	77,649	127,428	205,077
1882	77,573	70,163	147,736
1883	125,170	68,149	193,319
1884	83,652	36,295	119,947
1875–1884	781,256	694,932	1,476,188
1885	132,641	67,935	200,576
1886	115,058	66,579	181,637
1887	109,451	58,254	167,705
1888	82,224	75,889	158,113
1889	123,517	100,872	224,389
1890	33,515	108,740	142,255
1891	46,091	89,658	135,749
1892	45,160	203,124	248,284
1893	9,912	246,940	256,852
1894	11,256	195,629	206,885
1885–1894	708,825	1,213,620	1,922,445

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Exportations of sugar from the Philippine Islands during the calendar years 1865–1904—Continued.

Calendar year—	Exported to United States.	Exported to other countries.	Total.
	Tons.	*Tons.*	*Tons.*
1895	59,615	171,308	230,923
1896	98,624	131,289	229,913
1897	24,353	177,740	202,093
1898	27,997	149,698	177,695
1899	21,542	62,929	84,471
1900	2,120	62,041	64,161
1901	5,143	50,831	55,974
1902	5,039	91,999	97,038
1903	28,852	55,108	83,960
1904 *	25,489	56,554	82,043
1895–1904	298,774	1,009,497	1,308,271
1865–1904	2,052,369	3,426,400	5,478,769

* Ten months ending October 31, 1904.

* * * * * * *

Import duties charged by foreign countries on Philippine sugar.

[The bulk of Philippine sugar exported to foreign countries is credited to Hongkong, Japan, and China. Hongkong is chiefly a port of transshipment. The import duties levied on sugar by Japan and China are given below.]

Japan:		
Sugar up to No. 15, exclusive, Dutch standard	per 100 pounds	$0.125
Sugar, refined, from No. 15 to No. 20 Dutch standard	do	.58
Sugar, refined, above No. 20 Dutch standard	do	.61
China:		
Sugar, brown, up to No. 10 Dutch standard	do	.10
Sugar, white, No. 10 Dutch standard and over, including cube and refined	per 100 pounds	.13
Spain:		
On sugar from foreign countries	do	7.45
On sugar from colonial possessions	do	2.94

Payable in paper currency—subject to wide fluctuation.)

On January 19 the Secretary of War cabled to the civil governor as follows:

[Cable sent January 19.]

Cable full details as possible concerning wages * * * and also workmen sugar factories, workmen island of Negros, supply of labor * * * in the island of Negros and sugar-producing provinces; also necessity for importing labor from Panay, Bohol, into Negros and wages paid.

The answer came on the 21st, two days afterwards, as follows:

[Cable received January 21.]

There is no probability of large increase in Negros. Common day laborers on sugar plantations receive 40 centavos and two meals per day. During the time cutting, hauling cane, receive 50 per cent more. Common laborers inside of mills receive 2 to 2½ pesos per week and three meals per day. Sugar makers 1 to 2 pesos per day.

Oriental, Occidental Negros, have enough resident laborers for preparing and planting crops, but need double that number during milling season, which lasts about six months.

Oriental Negros draws its extra supply of labor from Cebu and Bohol; Occidental Negros from Iloilo, Antique, Capiz, and adjacent islands. This source unsatisfactory and unreliable. Crops this year in Negros about one-half highest yield prior to revolution. While conditions are slowly improving, it is hardly probable former production will again be reached for several years, on account of the scarcity of draft animals, lack of labor, and other causes.

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Mr. WATSON. How much is a centavo?

Colonel EDWARDS. It is half of our cent. In all these statements you can just divide by two to get the values in gold.

Mr. WATSON. They get 20 cents a day, then, and two meals?

Colonel EDWARDS. Yes, sir. Some gentlemen of the committee asked the question, What are the average interisland freight rates to shipping points? The following cablegram was sent to get that information:

[Cablegram sent January 23.]

What are the average interisland sugar freight rates to shipping points; for instance, Manila, Iloilo, Cebu, as well as exporters' prices sugar at these points? What are the average through freight rates San Francisco and New York? Also tobacco? Rush answer by cable.

On the 25th the following cablegram was received in reply:

[Cablegram received January 25.]

With reference to your telegram of 23d, average interisland sugar freight rates to shipping points are .25 pesos ($0.1250) a picul (137½ pounds); cost of placing sugar at original shipping point and handling at the port of exportation probably one-half peso additional. Exporters' prices at shipping points approximately 7 pesos ($3.50) a picul (137½ pounds). Through freight rates New York average 10⅞ pesos ton. Nominal rates San Francisco 10; none shipped that route.

Mr. WILLIAMS. In that connection, just one more question. You spoke of the two or three meals per day. Do you know what those meals consist of that are furnished to the laborers?

Colonel EDWARDS. The principal component is rice, and the second component is fish. From analogy of the experience of the Manila Tramway Company, which is just completing that large tramway, I should judge that the very least cost would be 5 cents a meal, because they have adopted the unusual expedient of furnishing to their laborers, right in their working parties on the track, a lunch every day. They figure that that lunch is a good investment. It not only puts additional fuel into them and makes them satisfied, but its cost is only, as the manager told me the other day, a little over 5 cents a meal, that is, when they buy the material in large quantities and serve it in that way.

Mr. WILLIAMS. They have to buy the material by retail?

Colonel EDWARDS. They buy it by wholesale, I assume. This is a large corporation, working several thousand laborers, and they get it down to a smaller cost than one generally could.

Mr. WILLIAMS. It would probably cost 20 per cent more, or 6 cents, if they had to buy the components by retail?

Colonel EDWARDS. Probably; yes, sir.

Mr. WILLIAMS. These freight rates that you speak of, were they for cargo lots?

Colonel EDWARDS. Yes, sir.

Mr. WATSON. When you say 5 cents a meal, you mean 5 cents in their silver?

Colonel EDWARDS. No, sir; 5 cents gold.

Mr. WATSON. Gold?

Colonel EDWARD.. Yes, sir. We always use the word "pesos" there to denote silver, and a "centavo" signifies their money, but when we use the word "cents" it refers to United States cents.

STATEMENT OF COL. GEORGE R. COLTON.

I have here, gentlemen of the committee, an original Filipino document. It was originally written in the Spanish language under the direction of the Filipino president of the Iloilo Chamber of Commerce, and it is therefore in Spanish composition. A translation has been made, and if it is the desire that I should read the petition I will do so.

The CHAIRMAN. You might read enough to show the object of the petition.

Colonel COLTON. Very well, I will do so [reading]:

ILOILO CHAMBER OF COMMERCE AND AGRICULTURE,
November 26, 1904.

To the Congress of the United States of America:

The Iloilo Chamber of Commerce and Agriculture, representing the sugar-cane growers of this American territory, respectfully requests that the customs tax

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now imposed upon Philippine sugar, when shipped to the mainland territory of the United States, be wholly removed, and begs to submit the following statement regarding the condition of the sugar industry in these islands and the necessities for the action requested:

The present situation of the sugar district is extremely discouraging, due to the bad crops of sugar harvested since 1898, and this condition, unless reckoning upon the abolition of the Dingley tariff, unfortunately will not improve, as, though the causes (war, revolution, rinderpest, etc.) which originally brought about the actual depression have disappeared, and apart from the critical financial condition of the planter, which prevents him from properly cultivating his estates, everything has become so dear that the cultivation of sugar cane does not even give him a sufficiency to cover his living expenses.

Before going into the reasons why we consider the abolition of the Dingley tariff upon Philippine sugar as the only measure, in our judgment, to prevent the total ruin of these provinces, we shall make estimate of what the production of the sugar costs. We will base our estimate on the expenses of an estate producing 4,000 to 5,000 piculs, or, say, from 250 to 312 tons, having chosen such an estate, as they are the most numerous. For the production of said quantity of sugar, plantings on an extension of about 125 acres are needed. The cost is as follows, taken from to-day's ruling prices:

	Philippine currency.
Plowing 125 acres ready to plant	₱625.00
Cleaning drains before planting	145.00
Planting 125 acres	675.00
Plowing four times between plants	430.00
Weeding and cleaning cane three times	850.00
Cleaning drains after cane has grown up	145.00
Cutting and transporting cane to mill	1,718.75
Making the sugar	2,313.00
Packing and mats	770.00
Lime, oil, tallow, petroleum, etc	267.00
Firewood	900.00
Carting, freight, and delivering expenses	2,250.00
Salaries	2,760.00
Unforeseen expenses	650.00
Rent (say depreciation, taxes, and repairs)	2,000.00
Interest at 8 per cent per annum on expenses	430.00
Total	16,928.75

We have taken into account 50 cents per picul for carting, freight to Iloilo, and delivering expenses as a low average.

One hundred and twenty-five acres of good land, as we have already said, produce, under normal circumstances, from 4,000 to 5,000 piculs, or 250 to 312 tons; say, 4,500 piculs (281¼ tons) as the average. We can not take into account a price higher than ₱4 per picul, or ₱64 per ton, though, as it is true that it can be higher, as it is just at the present moment, it can also be lower, as it happened last crop, when a large proportion of same was sold at 3.50 to 3.87½ Pfs. Mexican per picul.

We obtain thus ₱18,000 for the 4,500 piculs, and if we deduct therefrom the ₱16,928.75, cost of its production (1 ton, at ₱60.18), we have a balance remaining of ₱1,071.25, or $535.62 United States currency, for replacing cattle (costing to-day ₱100 to ₱145 each) and for the living expenses of the planter. This is under favorable circumstances, but should they be the reverse, such as drought, excessive rain, or locust, then the results are disastrous. How many planters saw their last crop dried up and then the shriveled cane eaten by locusts.

It can not be wondered, then, that the crops which in 1897 and preceding years amounted to 150,000 tons and more should have diminished to about 80,000 tons in the past year, while the prospective crop is only estimated at 65,000 tons. That to follow in all probability will be an equal percentage smaller. Thus gradually an industry fostered by the late Spanish Government will be dead within four to five years.

It may be asked, If the cane planters have experienced such bad results, why have they not grown something else? We will suppose that the planters should be willing to lose the millions of dollars now invested in machinery in Panay and Negros, and that, though the cultivation of sugar before all other work is

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eminently more suitable to the constitution of the Filipino, they would be willing to change sugar growing for any other product, to what other product could they turn their attention? As cotton, coffee, cocoa, and tea can not be thought of on account of the local climatic conditions, there only remain hemp, copra, and rice. In some few specially selected parts hemp is growing and being extended all possible; sea-beach land might be more taken advantage of for growing copra, and the lowlands in the interior of Panay and Negros dedicated to rice, but what is to become of the rest of the lands now dedicated to sugar cane? Forcibly they would be fallow. In such an event what would become of the 700,000 people now living by the sugar industry? What means can be provided for them? And, further, by what other means could the landowner provide his government taxes?

* * * * * * *

Those interested in American sugar may rest tranquil on this score and have no fear of Philippine competition, which seems to be the terrifying but delusive dream that haunts them. In the Visayas there is a great scarcity of laborers. At the time crops were 150,000 tons a good many planters were greatly pushed to obtain the necessary labor. The scarcity of labor is to-day more serious, owing to the late revolutions, cholera, fevers, and—why should we not say it?—on account of famine. For these reasons, as long as the population of the Visayas does not increase considerably, we are sure that the production of sugar can not surpass a limit of 175,000 tons, the government forbidding us to look elsewhere for laborers. This is on one side; on the other we have open to us the Chinese markets.

Formerly sugar was unknown in the interior of China, and less than twenty years ago the only sugar exported from here to China went to the Hongkong refineries to be refined and reexported to Australia. This has changed; to-day our sugars, owing to their late cheapness, have been introduced by Chinese merchants into the interior of China, where it is consumed in its raw state and is now a yearly increasing domestic necessity, as confirmed by statistics. If we compare China with Japan, where twenty years ago sugar was almost unknown and which now possesses important refineries, we are certain that China will also quickly have its refining centers, when all the sugar we could possibly produce will not suffice their wants. The abolishment of the Dingley tariff would raise our basis for sales to Chinese markets and oblige the Chinese merchants, who know that by paying a little over European values they can secure our sugar, to pay the full value for it. At equal prices there can be no doubt that Philippine sugars will go to near-by China, where they are sold on color and not on polarization, and where the seller is not exposed to any claims even in falling markets.

* * * * * * *

Respectfully submitted.

RAYMUNDO MELLIZA,
Angulo, President Iloilo Chamber of Commerce and Agriculture.

The CHAIRMAN. There is a certain item that you named in the beginning of that petition that ought not to be counted in more than once in every seven to fifteen years, is there not—the planting and draining?

Colonel COLTON. No, sir; it is every year.

Mr. CLARK. They do not plant sugar cane every year, do they?

Colonel COLTON. Yes, sir; in the Philippine Islands.

Mr. CLARK. Why, somebody testified here the other day that they did not plant the sugar cane but once in every seven to fifteen years.

Colonel COLTON. That is a great mistake, sir.

The CHAIRMAN. Do you know that of your own knowledge?

Colonel COLTON. Yes, sir. It is planted every year.

Mr. CLARK. We want to get the straight of it.

Colonel COLTON. I do not mean to say but that the sugar cane might grow if it was not planted every year, but they plant it every year, as a matter of fact.

* * * * * * *

Colonel COLTON. The natural market for the Philippine sugar is China, and to that market it will go, but at the price fixed by competition.

Twenty years ago sugar was unknown in the interior of China, and the small quantity shown by statistics to have been shipped there was refined in Hongkong and reexported to Australia and elsewhere. During recent years, however, owing to the fact that no profitable market has been open to Philippine

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sugar, Chinese merchants have taken it in continually increasing quantities, but at a sacrifice to the producers, and gradually introduced the use of it among their people until it has become a commonly known commodity and domestic necessity in that country.

* * * * * * *

The consumption of sugar in China, like that of flour, is increasing so rapidly that the possibilities of the future are incalculable. Flour importations have increased tenfold in ten years and there seems no limit to the amount those countless millions will be able to consume. This is true of any foodstuff which is well received by the Chinese people and the price of which can be kept in reach of either the masses or the middle classes.

Ten years ago the Philippines sent but little sugar to China for consumption, but during the last few years of unfortunate market conditions China has become the dumping ground for that unprofitable product, where it is consumed in its raw state.

The trouble with the Philippine sugar industry is not a lack of near-by consumers, but the low price at which the product must be sold. The shrewd Chinese merchant is not apt to pay more for a product than it is worth in the markets of the world. He knows perfectly well that by offering the equivalent or even a little less than European or American values, whichever happens to be the higher, taking into consideration the difference in freight and other expenses attending long shipments, he will be able to buy the Philippine sugar, because his market is within four days' sailing from the Philippines, settlements are more easily, quickly, and always more satisfactorily made, and, most important of all, he is compelled to ask no questions about polarization, as sugar is sold and bought in China entirely upon its color.

* * * * * * *

The absence of thrift or industrial habits, which generally characterizes the Filipino laboring classes, renders it exceedingly difficult to largely increase the production of any article dependent upon manual labor. An increased wage does not always insure greater industry. It is as likely to suggest fewer working days to earn the necessary amount to sustain life.

There was a long period when the production of sugar in the Philippines yielded large profit, and planters exerted every effort to increase their output to the utmost extent; but owing to the labor condition outlined they were never able to force the production much beyond the normal crop of from 100,000 to 150,000 tons.

One of our most serious difficulties in treating with the Filipino people has been, and undoubtedly will continue to be, the lack of any real conception of oriental, and particularly Malay, character. The laboring classes are generally what we should call improvident. They live for the day and let to-morrow take care of itself. They do not see any need of acquiring a competence, and savings banks are unknown. The tropical climate and local conditions are largely responsible for this. In ordinary years no serious effort on their part is required to maintain themselves according to their customs in comfortable estate. Therefore the great majority of them decline to work, even when the opportunity is offered, and stoically take the consequences of their lack of thrift as the times change. The Visayans, however, who inhabit the sugar-producing islands, have learned more industrious habits through pressure by the native sugar planters, and now depend almost entirely upon the occupation which the sugar industry affords as a means of livelihood. But it is to these people alone, whose working capacity has now been fully developed and is known, that the planters must look for their labor, for, owing to race prejudice and the lack of desire to work, it has been, and will always be, impossible to induce natives of other islands to enter the Visayas or assist in the work.

From personal observation of the conditions and a careful study of the people engaged in producing sugar in the Philippines during a residence there covering the period of American occupation, I am firmly of the opinion, as all agree who have studied the question on the ground, that an increased price for the product, which might be brought about by the competition that would be furnished by the removal of the customs tax in this country, would only result in a return to the normal production attained in years past when the market conditions have been favorable. Further extension of the industry can only occur very gradually through an increase in the population of the sugar-producing islands or the importation of cooly labor, which is prohibited.

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[From same hearings, p. 178.]

[From report of investigations in the islands of Cebu and Negros with the view to the selection of a site for a model sugar estate, by Oswald A. Steven. (Report of the Philippine Commission, p. 633.)]

Upon receipt of my commission as special agent of the Interior Department, dated February 10, 1902, and also your letter of instructions, dated February 11, 1902, I proceeded, as per your instructions, to the islands of Cebu and Negros for the purposes of examining lands on these two islands and to select a suitable site for a model sugar-estate experimental farm, and later, as per your telegram, to combine therewith an industrial school. * * *

Sugar.—The tendency of the sugar planter in the Philippines is to grow sugar on the low, level lands, where the soil is largely the same over the entire islands—namely, a black, heavy soil or a brown loam. With an abundance of level land the planter has not been compelled to cultivate the higher mountain lands nor a different soil from that he is conversant with, but immediately following the natural increase in the cultivation of lands to sugar, from modern methods of agriculture and machinery, demonstrating the immense profits from the proper cultivation of sugar, these other soils and elevations will be brought under cultivation, and a cane seed especially adapted for such soil or elevation will have to be primarily grown by the experimental station, and hence the actual necessity for varied soils and elevations.

[Pages 634, 635:] Adjoining and in the vicinity of a model sugar estate there should be enough farms now raising sugar whose cane could be ground at the model mill, the returns from which, being carried to the credit of the mill, would pay off the indebtedness of the mill and farm in five and a half years at present prices of sugar and under present conditions.

These mentioned requirements, together with the fact of suitable soil as to quality and depth, is what I am certain is necessary to the site upon which is built a model sugar mill and experimental station.

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[From same hearings, p. 185.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

* * * * * * *

There is another industry that for some years has exported more of value than the sugar industry. That is the cocoanut industry, and the trees are being planted all over the islands, because after six years of waiting a cocoanut tree becomes a capital for a hundred years. A cocoanut tree after six years will produce enough to rent for from about a peso (Mexican) to a peso and a half, and without any cultivation at all. And that, I may say, suits the native workman and the native capitalist exactly. All he has to do is to sit down and wait for these cocoanuts to grow, and the only labor connected with it is the clearing of the weeds from the bottom of the trees and the collection of the nuts from the tops of the trees. The cocoanut does not grow in all soils, but it grows very well along the seashore and along the lake shore, and in some provinces, for instance in the province of Laguna, which is a rich province and has a good deal of sugar and rice land, the extension of the cocoanut industry has been so great that the cultivation of sugar and rice have practically faded out. That is not so true of the rice as of the sugar.

The CHAIRMAN. Will the cocoanut grow on the same land that sugar grows on?

Secretary TAFT. High land sugar?

The CHAIRMAN. Yes.

Secretary TAFT. Yes, sir; it will. Then there are other industries, as mentioned here. There are the rubber industry and the cacao industry as well as others, and then there is, in the islands, growing wild, camphor, the world's supply of which is at present produced almost entirely in the island of Formosa. We have the wild camphor tree in the northern part of the islands, and we are quite hopeful that that may be developed into an industry; and because of the few places in which it can be grown that it will become a valuable industry.

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We are not confined to sugar or tobacco, and we do not think that either—though we are quite agreed they are important industries in the islands—ought to be stamped out deliberately.

* * * * * * *

With respect to the sugar of the Philippine Islands, Negros is the great province for the raising of sugar, but a large part of that province is mountainous, and the southern half of it—certainly the southern third of it—is an impenetrable wilderness. It is something that for years can not be changed into anything other than a forest out of which timber is to be drawn.

The other province in which sugar is raised is Pampanga, in Luzon, and then some is raised in Cavite and some in Laguna. But the stimulation in respect to sugar will be almost wholly within the provinces of Negros and Pampanga, I ought to have mentioned the province of Iloilo, in Panay; and possibly some would be raised in Cebu. I ought also to make my remarks apply only to the province of Occidental Negros, for Oriental Negros, which is on the eastern side of the mountains, produces comparatively little sugar and is devoted much more largely to hemp and rice; and wherever hemp goes, everything else moves out.

The question is asked what it would cost to turn other lands into sugar lands. I am unable to give anything on that except to say what sugar land is worth. It is worth from $20 to $40 an acre, and uncultivated land in Spanish times was sold at $5 a hectare, or about $2 an acre; and I assume that the cost of clearing lands may be determined somewhat by the difference between the price of uncultivated land and the price of cultivated land, although of course that is not an accurate method of determination.

* * * * * * *

Mr. CLARK. As to the machinery that is used in preparing the sugar, is that equal in any way to the machinery used by the Louisiana plantations, do you suppose?

Secretary TAFT. No, sir.

Mr. CLARK. How much would it cost to substitute American machinery with the present production of cane? Would it increase it as much as one-fourth, do you suppose?

Secretary TAFT. I think it might. I think perhaps it might increase it more. My idea is—I want to be frank—that the sugar fields of the Philippines Islands can produce, if treated in the same way, as much as Cuba can; that is, I mean if you have the same modern machinery and the same treatment.

Mr. WILLIAMS. As much per acre?

Secretary TAFT. Yes, sir; per acre. I am not quite sure. I am not well advised about the machinery necessary. I understand that it takes about a million dollars to produce 15,000 tons a year. I mean the machinery plant would cost about that much. The soil in the Philippine Islands adapted to sugar, I fancy, is just about as rich for sugar purposes as the soil in Cuba; that is, that soil that is adapted to sugar is. Of course it is a good deal farther away, and for that reason the risk of investment is considerably greater.

Mr. COOPER, of Texas. What percentage of the area of the islands do you think is adapted to sugar?

Secretary TAFT. I should doubt whether any more than the provinces I have mentioned—Negros, Pampanga, and Iloilo—would be likely to be devoted to sugar.

Mr. COOPER, of Texas. In acres how much would that amount to?

Secretary TAFT. I could not tell you that. A great deal of all of those provinces is in hill land and in forest. It is not so in Pampanga. Pampanga has sugar and also rice. But there is a good deal of swamp land in that province which is adapted to nothing but the growth of the nipa palm, from which is produced the "vino" or the whisky of the islands. In the height of the sugar industry in the islands there may have been 400,000 acres under cultivation. I do not suppose that to-day there are more than 200,000 acres under cultivation.

I am not sure about that, but that is a guess founded on a statement made some years ago by an English consul who went over the island to investigate and made a report as to the number of hectares then in cultivation. That was made in 1888. The acreage since 1893 has become less. When sugar land or any other land is allowed to lie fallow and idle, there comes into it the cogon grass or weed, which grows to a height of 12 or 15 feet, and its eradication is a work of great difficulty and cost. The sugar development of the islands will be necessarily in the direction of clearing that which was old sugar land until it is all exhausted.

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The limitation of labor upon the amount of land which it would be profitable to cultivate is the most serious one, and it is the one which completely destroys all the supposition that there is to be an enormous extension of the sugar production there.

Mr. WATSON. Do you know whether or not they have ever tried in the provinces to cultivate the sugar beet?

Secretary TAFT. No, sir; I do not think they have. I do not mean to say that there are not other provinces than those I have mentioned in which there is sugar grown. It is grown in every province. But I have been speaking of sugar for exportation. It is grown in other provinces, as I suppose that it can be grown in all parts of the Tropics; but it is grown there for food purposes. People eat the sugar cane. That is the case largely in the Ilocos provinces. The Ilocos provinces have more tobacco than they have sugar, and it is not very wise to grow tobacco and sugar in close proximity, for the reason that the sugar with its sweetness attracts all sorts of insects and worms, and the tobacco crop is very much injured by the presence of them.

If I understood the argument here it was that we were to have 50,000,000 acres of sugar at 5 tons to the acre, and 50,000,000 acres of tobacco at 2,000 pounds to the acre. I do not know where they were going to put it. I suppose they were going to overlap each other in producing this enormous quantity that was to swamp the industries of this country.

Mr. WILLIAMS. Do the Philippines now export or import foodstuffs, upon the whole—how is the balance?

Secretary TAFT. For upward of ten years, I should say—five years before we went there and five years since—we have imported rice into the islands. But that importation has increased in the last three years with great rapidity, due to the very disastrous conditions of agriculture. You know the rinderpest carried off from 75 to 90 per cent of the cattle; that is, the carabao—the water buffalo.

The Filipino knows no other method of cultivating rice than by constructing a rice paddy with a dike around the field. Then he plants the rice in a little corner and waits until the rain comes to make a pond or muck inside the dike. Then he plows, not in the dry but in the wet, in the mud, and the water buffalo is almost an amphibious animal and is able to stand the strain. He is almost webfooted. The plowing is done with a light plow hardly heavier than a big stick and with the buffalo. Then, after the field is plowed, the natives go in in their bare feet, sometimes to music and sometimes not, and plant each rice plant separately.

Now, the destruction of the carabao, you can see, very seriously interferes with the production of rice, and that increases the necessity for its importation. So that last year there was an importation of $15,000,000 worth of rice. I am told by a cable from General Wright, and I also learn from the reports, that the rice crop this year in the islands is better than it has been at any time since the American occupation, and I am very hopeful that that importation of rice will be considerably reduced. But before the rinderpest and the war the importation of rice could not be attributed to a failure of the carabao, because the carabao was there. I presume that it was due to the change from the cultivation of rice in the southern provinces to the cultivation of hemp. Hemp became so much more profitable that they preferred to cultivate the hemp and buy the rice, and therefore, although there are a number of unoccupied tracts of land that would be available for rice culture, the supply of labor was not sufficiently great, or the energy of the people was not sufficiently great, to raise both their food products and hemp, so that they raised the hemp and bought the rice.

Mr. GROSVENOR. They bought more rice than they sold hemp by about $2,000,000.

Secretary TAFT. No, sir; the hemp was $21,000,000.

Mr. GROSVENOR. I thought it was only $13,000,000.

Secretary TAFT. No; you are thinking of the hemp imported into this country?

Mr. GROSVENOR. Yes, I am; that is right.

Mr. CLARK. What do they use to drive out there?

Secretary TAFT. The carabao. They have ponies, but the carabao is the mainstay. They have cattle, and they sometimes use what they call trotting bulls, and put them into a little buggy, a little carramata, but they ordinarily drive with the carramata a pony, and for drawing heavy loads they use the water buffalo, the carabao.

Mr. CLARK. Do they eat any meat over there?

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Secretary TAFT. They eat carabao meat sometimes. They eat more fish than meat. There used to be a good deal more meat eaten than now, because not only the carabao were affected by this rinderpest, but great herds of cattle, like the Indian cattle, bulls and cows, on the island of Masbate and other ranges were swept from the islands. They are gradually being restored by nature. Enough were left to found the race again, and in the course of ten years I hope that there will be a great supply of beef cattle there.

Now, the people live on rice, or on rice and fish mixed together. The fish, if a little touched, strikes the ordinary Filipino with the same degree of pleasure with which the canvasback duck that is a little offensive strikes the gourmand on this side. They do not mind fish a little old. They also have camotes, or sweet potatoes, which grow rapidly and make a fairly good food, although they are rather indigestible and lead to stomach troubles. Rice is the best food that they have.

Mr WILLIAMS. What I was trying to get at was whether, from the density of population of the Philippines, a great quantity of the land will not always be required to raise food for the people?

Secretary TAFT. It ought to be; yes, sir. The evidence taken with respect to the price of the friars' lands—and this is in one of the reports of the Commission which I will submit to the committee—is to the effect that in Bulacan and Cavite and Manila, according to the opinion expressed by the expert, the cultivation of rice was more profitable than the cultivation of sugar, and those provinces are not especially sugar provinces as Pampanga is and as Negros is.

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[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines, of the United States Senate, p. 217. Reprint public hearings in Manila, P. I., August 7, 1905.]

STATEMENT OF MR. LEON MIGUEL HERAS, OF FLORIDA BLANCA, PAMPANGA.

* * * * * * *

PRINCIPAL CAUSES OF THE DECLINE IN THE CULTIVATION OF SUGAR CANE IN THE PHILIPPINES AND THE PRESENT CONDITIONS OF SAME IN THE PROVINCE OF PAMPANGA.

Capital.—The great scarcity of money is the principal cause of the precarious condition of those engaged in the cultivation of sugar cane, and it can almost be affirmed that 90 per cent of the planters in the province depend upon Chinese buyers, who never advance money except at a rate of interest fluctuating between 20 and 40 per cent. This statement makes it easy to understand that it is impossible for the industry to prosper, having such interest to pay and selling the sugar at prices as low as the prevailing ones.

Cattle.—The great scarcity of cattle is another of the principal causes preventing the revival of agriculture in the Philippines, for the diseases that have decimated work cattle not only have not disappeared but have increased, as investigation will prove.

The difficulties with which the planter has to contend increase when we take into consideration the customs and manner of being of our rural population, unaccustomed to use the class of work animals employed in other countries, for which reason the carabao can not at the present time be substituted. For example, it has been attempted to employ oxen imported from China, with negative results, 60 or 80 per cent having died soon after importation.

The share system in the cultivation of land.—One of the greatest disadvantages of the Philippine planter consists in the manner in which the land is worked, this being done in very unfavorable conditions, due in the first place to our tropical climate and to the few wants of our rural population.

Laborers.—The labor used in the manufacture of sugar is very high priced at present, owing to the increased price of staple articles and, as has been stated, to the loss of work cattle, resulting in a large reduction in the area under cultivation. A large number of the laboring people, always scarce, have gone to Manila in search of work not to be had in the province, and owing to this great scarcity planters have now to pay treble and even quadruple the old wages.

It is well to note that this scarcity of laborers is due in a large measure to the custom among the great majority of our working people of not desiring to change their place of residence for any length of time. It is for this reason that, in spite of the lapse of a great number of years, no plantation in the province has produced more than 10,000 piloncs—that is to say, about 680 tons—95 per cent of the planters producing only from 20 to 200 tons.

To prove the scarcity of hands and that our working people are not inclined to emigrate, the fact can be cited that in the hemp districts a laborer can earn as high as ₱5 a day ($2.50, gold), and that, notwithstanding this large wage, people in other provinces have, up to the present time, not been known to go to those districts to work.

Risks.—Many and varied are the risks in this class of cultivation that can not be foreseen, much less controlled, such as fires, floods, droughts, and locusts; from this last calamity the province has suffered for three consecutive years.

Production.—Owing to the imperfections of our machinery and system, it is estimated that there is a loss of from 20 to 30 per cent more than in other

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countries using modern machinery. Aside from this loss in the quantity produced, there is a loss in quality on account of the imperfection of our product.

No favorable change can be expected in this particular for many years, on account of the reasons above stated, to wit, lack of capital, cattle, and labor.

Transportation.—The means of transportation existing at present—and we suppose that conditions are alike in this respect in the other provinces of the archipelago—can only be used during four or five months of the year—that is to say, during the dry season. For this reason the cost of transportation in some places amounts to 30 per cent of the value of the articles transported.

Internal revenue.—The imposition of this tax has made the situation of the sugar planters in our province still worse, resulting in a loss to us of from 25 to 30 per cent of our product, as prior to its enactment we sold our molasses to alcohol distillers at from ₱1 to ₱1.60 a 4-gallon can, while now we get only ₱0.20 to ₱0.30 for the same amount.

Reduction in the total production.—A great reduction has been noted in the area planted, owing undoubtedly to the causes above mentioned, as in the provinces like the two Ilocos, La Laguna, Batangas, and others, formerly producers on a large scale, planters have substituted maguey, hemp, cocoanuts, etc., which give better results.

When the provinces mentioned were large sugar producers the total yield for the islands reached 300,000 tons, which figure has been steadily decreasing, production having fallen off to its present miserable condition.

Markets.—The largest and most natural markets for Philippine sugar at present are the countries of China and Japan, now the largest consumers of our product, and owing to this favorable condition Chinese buyers, having no competitors, obtain our sugar at their own prices and therefore are able to impose their own terms.

According to approximate figures from the Philippine bureau of agriculture the total area of the archipelago is 73,000,000 acres, of which 50,000,000 acres are forest and mountain lands, and of the 23,000,000 remaining only 3,200,000 are cultivated to all crops as follows: Sugar, 180,000; rice, 1,600,000; tobacco, 80,000; sweet potatoes, 60,000; plantains, 85,000; hemp, 550,000; cocoanuts, 375,000; corn, 267,000.

It is seen from the above figures that 180,000 acres being cultivated to sugar and 2,200 pounds being the average yield per acre, we have a total production for the entire country of 180,000 tons of sugar. Admitting that after many years the production shall have doubled—which appears improbable—it would have reached only 360,000. Now, if we deduct 80,000 tons, which is approximately the amount consumed in the islands, but 280,000 tons would remain for exportation.

According to the statistics the amount of sugar imported into the United States for home consumption is nearly 2,000,000 tons; admitting that the archipelago should produce the 280,000 tons mentioned, there would still remain a shortage of some 1,700,000 tons, and we can not understand how our production, if permitted free entry into the United States, could harm the interests of sugar producers in the sovereign country.

In asking for the abolishment of the duty on our sugar imported into the United States we do so principally for the purpose of securing better prices from our present consumers, the Chinese and Japanese, inasmuch as, by having another market for our sugar, they could not impose their prices on us.

If present prices continue it is not too much to predict the total ruin of the industry at a not far distant date, as is proven by the following figures:

Cost of production of 2,000 piloncs of 150 pounds each—that is to say, of 136 tons.

272 acres, at ₱58.179 per acre	₱15,824.68
Machinery, warehouse, buildings, etc	7,000.00
80 work carabaos, at ₱160	12,800.00
40 native plows, at ₱6	240.00
10 carts, at ₱60	600.00
Total	36,464.68

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Annual expenses.

1 plantation overseer	₱1,200.00
Wages of hands	2,000.00
Mortality of cattle, 20 per cent of ₱12,800	2,560.00
Land tax	131.25
Wear and tear of plows, 50 per cent	120.00
Wear and tear of machinery, etc., 15 per cent	1,050.00
Wear and tear of carts, 25 per cent	150.00
Cost of manufacture, at ₱1.51	3,020.00
Hauling to warehouse, at ₱0.30	600.00
Interest on capital, ₱36,464.68, at 10 per cent	3,646.47
Total	14,477.72

An average of ₱7.24 cost per piloncon, or ₱106.45 per ton.

The average prices during many years have been between ₱3.50 and ₱5 a piloncon, which proves the assertion made in the foregoing paragraph.

If the plantations that are still being worked have been able to keep up it is because the owners have not suffered the total loss of their animals. Those that have had the misfortune to lose them have been compelled to suspend all work on their lands, as has happened in the plantations of La Laguna, Ilocos, Batangas, Bataan, and other places.

Senator FOSTER. Will you please ask the speaker how often it is necessary to replant the cane?

Commissioner LUZURIAGA. We have to do so every year; our lands are not as rich as those in the island of Cuba, and therefore we are obliged to plant yearly.

Senator FOSTER. Ask him if the cane is not ratooned for one, two, or three years.

Commissioner LUZURIAGA. It is very rare in the island of Negros to get a ratoon crop. I know of one or two exceptions where they have been able to do so, but they have found great difficulty in trying to get a third crop, and it does not pay for the labor necessary to gather it. The lands upon which this can be done, furthermore, are considered very valuable and are very high priced and very rare.

Senator FOSTER. What proportion of the crop does it require to replant?

Commissioner LUZURIAGA. About 80 per cent has to be replanted every year.

Senator FOSTER. But what proportion of the original crop is required to replant the same acreage from which it came?

Commissioner LUZURIAGA. The practice in the Philippine Islands with respect to replanting is to cut off the last section of the cane, the tops, which are placed in germinating beds and then replanted; that is the practice here; they take the topmost part of the stalks and plant them.

Senator FOSTER. How many pounds of cane can you get from your new land?

Commissioner LUZURIAGA. The average is 1 ton of sugar per acre. There are exceptions; sometimes newly cultivated land—fresh land—will produce more, but the general average is 1 ton of sugar per acre.

Senator FOSTER. How many tons of cane per acre?

Commissioner LUZURIAGA. It is not the practice here to weigh the cane; I can not answer that question. Agriculture in these islands has not reached that point of perfection; I do not know of any farmer who weighs his cane. This fact will forcibly demonstrate to the gentlemen of the delegation the backward state of agriculture and this industry as conducted in the Philippine Islands.

Senator FOSTER. Is it necessary to use fertilizers or irrigation on the land?

Commissioner LUZURIAGA. No, sir; neither one nor the other.

Secretary TAFT. Senator, will you ask him if that is true in all the provinces?

Senator FOSTER. Yes, sir. Does that apply everywhere?

(Señor Leon Miguel Heras, a planter from the province of Pampanga, here arose.)

Señor HERAS. I would like to say in explanation of the statement of Commissioner Luzuriaga that it is not necessary to use fertilizers here; that the reason fertilizers have never been used here is because the people have not been educated up to the use of them. It is not because fertilizers are not required; it simply has never been the practice to use them.

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Secretary TAFT. How about irrigation?

Commissioner LUZURIAGA. Irrigation has never been used as yet in the sugar lands, though it is used upon the rice lands sometimes.

Secretary TAFT. But he does not mean to say that they do not use irrigation in Cavite—for instance, on sugar land?

Commissioner LUZURIAGA. Not in the cultivation of sugar; with rice, yes.

Secretary TAFT. Don't they use irrigation in the cultivation of sugar in Pampanga?

Señor HERAS. No, sir; but in Iloilo they do.

Senator FOSTER. What is the average price paid per day for labor by sugar men?

Commissioner LUZURIAGA. Field hands are paid from 40 to 50 centavos per day—that is, 20 to 25 cents, American money—but the laborers used in the mills get nearly double that; besides they are all provided with their food by the planters.

Senator FOSTER. You say that is 25 cents a day, gold?

Commissioner LUZURIAGA. Yes, sir; the field hands get 25 cents, gold, a day and their food.

Senator FOSTER. About what is the cost per day of feeding them?

Señor HERAS. In my province of Pampanga it costs from 20 to 25 centavos per day for the food; the food provided is very inferior in quality and quantity. It is not food for an American or European laborer, nor could an American subsist upon it at all.

Senator FOSTER. How many acres of land can one man cultivate per year?

Commissioner LUZURIAGA. One man can cultivate per year 2½ acres.

Senator FOSTER. You mean cultivate and harvest?

Commissioner LUZURIAGA. No, sir; the work of harvesting is separate from that estimate, and, besides, the man cultivating 2½ acres must have the assistance of a plow and carabao, and in some cases it is necessary for him to have two carabaos in a year to do that work.

Senator FOSTER. One man and two carabaos will cultivate 2½ acres of cane per year?

Commissioner LUZURIAGA. Yes, sir; and in some cases he can do it with one carabao.

Commissioner WORCESTER. Can he also prepare the land for planting and plant it?

Commissioner LUZURIAGA. Yes, sir; that is one man's work; that is equivalent to 1 hectare of land; but what that man can not do is the work of harvesting; this does not include that nor does it count any of the work of cutting the cane and hauling it to the mill; it is simply the work of cultivation; that is all.

Senator FOSTER. What are your sugar-making months—the period in which the cane is manufactured?

Commissioner LUZURIAGA. From December to March or April.

Senator FOSTER. When do you plant the cane?

Commissioner LUZURIAGA. The same months are the months for planting for the reason that it is our custom to use the top of each stalk for replanting.

Senator FOSTER. Do you know the largest sugar-producing plantation in the islands; and if so, what is the productive capacity of sugar per day?

Commissioner LUZURIAGA. Yes, sir; the largest sugar mill in the islands is located at Talisay, in the island of Negros, and is owned by Señor Jocson. This mill will produce, under the above conditions, 300 piculs per day—a picul is 137½ pounds.

(Mr. Welborn, chief of the Philippine Bureau of Agriculture, here arose.)

Mr. WELBORN. Three hundred piculs are equivalent to about 20 short tons, English measure.

Senator FOSTER. That is about 40,000 pounds?

Mr. WELBORN. Yes, sir.

Senator FOSTER. How many men are employed in the field and around the sugarhouse, skilled and unskilled labor, in producing that amount of sugar per day, in such a sugarhouse as that the speaker mentions?

Commissioner LUZURIAGA. Conditions vary so much in different sections that it is difficult to state the exact number of men required to produce that amount of sugar. It depends upon the fertility of the soil, the location of the land, etc., but there are gentlemen here who have estimates of the actual cost of production under different conditions, and they may furnish the information required.

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I have the figures here of one sugar estate in the town of Talisay, in the island of Negros, which I will read if you desire.

The CHAIRMAN. I presume the gentlemen would be glad to hear it.

Commissioner LUZURIAGA. The different conditions under which the sugar crop is raised must be taken into consideration. Planters sometimes administer their own estates, and in that case the number of laborers employed is greater than when it is let out by contract; sometimes contracts are given for the cultivation of certain parts of their land to different men, for a fixed price; then the number of laborers employed is less.

STATEMENT OF PROF. W. C. WELBORN, CHIEF OF THE BUREAU OF AGRICULTURE.

Mr. WELBORN. Before proceeding I promised some gentlemen to give some figures out of the census returns which I got when I went to lunch. The question was as to the size of the sugar estates in the islands.

There are 916 sugar mills in the islands. About one-half of this number are animal-power mills and the other one-half steam mills. Five hundred and sixty-nine of these mills are in the island of Negros, the island which produces perhaps eight-tenths of all the sugar exported from the Philippines, and practically all the rest are on the island of Luzon. Assuming that each mill serves one estate, the estates average for the two islands 176 acres planted to each estate; for Negros 127 acres planted to each estate.

Now, I shall not consume time in arguing the political or legal questions concerning the Philippines and the United States. I am here to testify somewhat as an expert concerning agricultural and business conditions in the islands and at home.

A little sugar is raised in most of the islands, but as a commercial product in only three or four. I find from the census returns recently arrived that Occidental Negros has been producing about eight-tenths of the sugar for export. Only 180,000 acres were planted in cane in 1902 and the average yield was 2,200 pounds per acre—the lowest for either cane or beet sugar made on the face of the earth. The average yield in Occidental Negros was 2,800 pounds per acre. The average yield for Pampanga, the next largest sugar-producing province, was about 1,100 pounds. For 1903 and 1904 I am sure, from personal observation, Negros has fallen off in yield and Pampanga has gained.

I find, in fact, that only 3,200,000 acres of land in the Philippines were cultivated in 1902. One-half of the whole is in rice. One-third of the balance is in hemp, 267,000 acres are in corn, about 375,000 acres are in cocoanuts, and about 80,000 acres only in tobacco.

Most of the land planted in cane in Luzon is poor and sandy, and probably does not average over 1,500 pounds of low-grade sugar per acre. Only one crop is gotten every two years. The land is too poor to grow a ratoon crop and is allowed to lie fallow a year, when it is again plowed up and planted. In the older lands of Negros the same method is used; but on the fresher lands one ratoon crop is often grown—never more—and then the land lies fallow a year.

One reason for low yields and poor quality of product in the Philippines is the very old and poor machinery in use. In Luzon there is nothing larger than a 3-roller mill in use, and I do not exaggerate when I say that at least half of the mills are driven by carabaos. In Negros there is one 5-roller mill of a pattern of twenty-five years ago; all the rest are 3-roller mills, and perhaps average a loss in the total juice of the cane of about 40 per cent. There is not a vacuum pan in the whole Archipelago, and not one pound of centrifugal sugar is made. The cooking is done in the old Jamaica train in vogue in other sugar countries forty years ago. The sugar, molasses, and all are boiled down hard and beaten up with spades and called sugar. It is a brown, lumpy, scorched sugar, polarizing about 84 degrees and containing a large amount of glucose, ash, and other impurities that prevent much of the indicated 84 per cent of sugar from being recovered at the refinery. Scarce and high in price as fuel is in the Philippines, no one has ever attempted to crush cane well enough to burn the bagasse without first sunning it. I have seen fifty men engaged in spreading the bagasse out over an acre of yard, raking it over to dry, and carrying it back to the furnace.

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With every other method about the mill and plantation just as crude, and with the period of low prices prevailing for several years past, there is no wonder that the sugar industry has almost starved to death, and with it the laborers working for the proprietors. With the carabao as the draft animal, any great expansion of the industry is impossible. The carabao works half the time and wallows in the mud the other half. He walks half as fast as a horse with a heavy load. With the native plow a man and the carabao will scratch over an acre of land in five days. It never takes less than three of these scratchings (called plowings) to put the land in shape for planting, and it often requires five. In order to grow 1,000 acres of cane, 400 carabao must be kept and 400 acres of land used for grazing them. Since the surra and rinderpest and other contagious diseases have become prevalent in the islands it is impossible to keep even 100 carabaos bunched together without disease cleaning out the whole of them, perhaps before a single crop can be grown and harvested. In making sugar in a tropical country planting must, of course, go on with the harvesting and grinding. Notwithstanding the ridiculous the American sugar men offered Colonel Colton's statement—that the cane is planted once a year and cut at twelve months of age—such is the truth and the whole truth.

So, at the present time, the mills in the islands—many of them now twenty to thirty years old—are becoming worse and worse worn, the mill buildings are falling down, and the people are without money and without credit to renew them. They do, it is true, get some credit from Chinese, who do a scalping business all over the sugar districts, and, to my own knowledge, have loaned money to planters at 10 per cent a month. When the high prices of the recently passed grinding season came the people were (most of them) not in position to be much benefited. The dealers of Iloilo and the Chinese everywhere knew of the rise in price first and, by making advances to help along the harvesting, contracted for the output at much below its value.

For the years 1887, 1888, and 1889 some three-fourths of all Philippine sugar went to the United States, and the production of that period was substantially twice what it is now. For the year 1902 it seems not a pound of Philippine sugar went to the United States. In 1903 the United States took about 35,000 tons of our low-grade sugar and imported from other foreign countries about 2,000,000 tons of sugar. This importation was exclusive of Hawaii and Porto Rico, which are regarded as United States territory, just as we believe the Philippines ought to be regarded. Philippine sugar, in other words, made up about 1½ per cent of the value of the home country's import of sugar. In 1904 about the same relative showing is made. The mother country, then, seems to be spending 3 cents for sugar from her Philippine colony every time she spends a dollar for Cuban sugar. If the United States took all our sugar, the bill would now amount to just 6⅝ per cent of what she is spending for this article in Cuba, or just about 3⅜ per cent of what she is spending in all foreign countries, including Cuba, for sugar. These calculations take into account the low grade of Philippine sugar and its smaller market value.

In the last twenty-five years Louisiana has multiplied her sugar yield by three, counting that the extra large yield given by the last exceptionally favorable season will be kept up. The beet-sugar industry is really less than fifteen years old as an industry, and in that time has attained a production of about a quarter of a million tons of sugar. In the meantime Hawaii and Porto Rico have been added to the United States, with the production of substantially a half million tons. In spite of all this, the United States has multiplied her importation in twenty-five years by more than two. Her consumption of sugar has multiplied by three in the same period of time. Let this rate of increased consumption go on for another quarter of a century, and the home beet-sugar crop may be multiplied by three, the cane-sugar crops of Louisiana, Hawaii, and Porto Rico may multiply by three, and still there would be room for the Philippine crop to multiply by sixty and all go to the United States. It is true we need not expect our home consumption to increase threefold in the next quarter of a century, but it is entirely reasonable to expect it to double, bringing the total requirement to 6,000,000 tons.

Nor will anyone acquainted with the Hawaiian situation be found to predict an increase in output of 100 per cent in twenty-five years, or even in one hundred years. The land and water are not there to double with. Nor will Louisiana likely more than double her product in twenty-five years—and these two sources make up about two-thirds of the present domestic supply. If

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consumption should double, and the present domestic supply should double, our present importation would have to double exactly, and this importation would require 4,000 per cent more sugar than the Philippines now produce. Is it reasonable to believe that the Philippines could ever produce as much sugar as all the balance of the tropical world now produces? I think not.

Should consumption remain stationary and home production double, there would still be need for a million tons of sugar, which is twice as much as the Philippines have prospect of ever producing.

There is room for considerable increase in sugar output in the Philippines, but the capital and the initiative and the organizing ability must largely come from the outside and join with the people here who own the lands. The people own the sugar lands, however, always in too small bodies to justify large factories. They generally have very little desire to sell their holdings, and still less to organize and cooperate in a way to make central mills a success. They are generally suspicious of each other and of outsiders, making business discouragingly slow.

There are no ports on the west side of Negros, and all sugar has to be hauled out of the interior and sent to Iloilo on small sailing craft that can come up to the coast with the tide. Until railroads are built no very great things in expansion need be looked for, and it is estimated to require five years to complete a railroad. The laws applicable to the islands do not allow a corporation to own land enough to justify a medium-sized central mill.

The sugar interests in the States have been pleased to speak of 70,000,000 acres of fine sugar lands in the Philippines and their enormous possibilities for production. By the same course of reasoning we may convince ourselves that the South will produce 100,000,000 bales of cotton, and the whole country 10,000,000,000 bushels of corn. Why, Louisiana has 12,000,000 acres alluvial land. If she should plant all this some year she would probably make 18,000,000 tons, or nearly twice the world's present supply. There is just about as much prospect of planting 1,000,000 acres in the Philippines as these 12,000,000 in Louisiana.

There is certainly more than three times as much waste mountainous land in the Philippines, in proportion to area, as there is in the cotton, corn, and sugar belts of the United States.

Some 50,000,000 acres of land in the Philippines are in forests, and the laws do not permit forest lands to be sold or leased until the valuable timber has been regularly cut under license, measured, and paid for. Even then a corporation can not own more than 2,500 acres, which is not regarded as sufficient to induce capitalists to invest in large factories. As a matter of fact, not a dollar of American capital has been invested in sugar growing in the islands during these six years. In fact, if suitable organizations could be effected so as to control the necessary acreage, I believe that a few central factories could do well in the Philippines.

Laborers are not ambitious to work at the prevailing rate of wages, but there is little doubt that, with some better inducements offered, a limited number of concerns could get the labor needed and make money. The price of labor is certain to advance with the building of the railroad system in the islands, and this result will still be more marked if roads, bridges, schoolhouses, and other public works badly needed are constructed. This industry must begin, however, just where Cuba began forty years ago and where Java began fifty years ago.

Now, I wish to state a fact that will surprise you. The farmers and farm laborers in the islands cultivate 2.56 acres each. In America each farmer and farm laborer cultivates 40 acres.

As you gentlemen can plainly see for yourselves, the great body of the present generation of Filipino people is without muscular development, without the habit of sustained industry, and lacking in that acquisitive ambition to make them steady laborers. People that have lived content for years working no more than 2½ acres to each actual farm laborer need not be expected suddenly to do great things in an industrial way. I believe a fairly good supply of labor for a limited number of enterprises can be had with a reasonable advance on present rates of wages; but the next generation must be looked to for the best results.

In the discussions before the Ways and Means Committee last winter a great deal was said as to the cost of production of sugar. The truth is, it costs every man a different price from every other man. Every different system

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shows up a different cost for each man. Matters of average cost are extremely difficult to determine, especially if that cost must be traced through field, factory, and through the markets.

* * * * * * *

Colonel HILL. You have been through the sugar plantations of the islands yourself?

Mr. WELBORN. Yes, sir.

Colonel HILL. And during all seasons of the year?

Mr. WELBORN. Yes, sir; more or less.

Colonel HILL. In the cultivation of sugar cane, you say they never use anything except the tops in planting?

Mr. WELBORN. No, sir.

Colonel HILL. When you prepare your fields for planting, how deep do you plow?

Mr. WELBORN. I don't know about that; they have to plow the land three to five times and I suppose go 4 or 5 inches. We have a great deal of Johnson grass, Bermuda grass, and nut grass, but they are minor pests as compared with the other grasses we have. They are much worse than anything you have in Louisiana. The native plow is a very crude affair, and a man takes a carabao and scratches over the ground, probably going about an inch deep in the first operation. If he goes over the ground three times, he will get an inch deeper each time. If he goes over it five times, I should say he would get about 5 inches deep.

Colonel HILL. Do you not think they would average more than 5 inches deep?

Mr. WELBORN. No, sir; I think not.

Colonel HILL. What other instruments do they use for cultivation besides the plow?

Mr. WELBORN. Well, nothing at all, except the simple little plow. Nothing but that, except when they are clearing off these heavy grasses; then they use a cane hoe. The grasses are very troublesome; that is one reason why it takes a man to cultivate one hectare of land here, whereas in the States he can cultivate ten or twenty times as much.

Colonel HILL. What is the last operation?

Mr. WELBORN. The last thing is to drag up dirt with hoes from the middles and heap it up in the drill to cover the grass and to make ditches out of the middles to stand our wet season.

Colonel HILL. Now, in order to have a hectare of cane cultivated by one man, how many carabaos are necessary?

Mr. WELBORN. Well, two carabaos are necessary to keep a man busy—one in the mud wallowing while the other is in use. They are changed about once every hour. A man should have an extra carabao; he can not work them steadily.

Colonel HILL. Is there any scarcity of hands when the grinding season begins?

Mr. WELBORN. Yes, sir; they get labor from the other provinces during that season.

Colonel HILL. How many tons of cane would be cut by one of your workmen?

Mr. WELBORN. I could not say about that. Nobody here weighs cane.

Colonel HILL. Have you ever made any estimate as to the tonnage per acre?

Mr. WELBORN. Yes, sir; it has been my opinion that the yield in Negros was about 2 tons of sugar to the acre; that would require 20 tons of cane under the methods here. But when the census report came, however, I found that in 1902 they made only 2,800 pounds to the acre in Negros, and that was a better year than we have had since, so I must reduce my figures.

Colonel HILL. I understand you to say that there is no explanation of the necessity of having cane replanted year by year?

Mr. WELBORN. Well, I would not make so sweeping a statement. In some places in Negros they do get one ratoon crop, but never more. The third crop would not pay for the gathering.

Colonel HILL. Is that the practice throughout Negros, or on the coast only?

Mr. WELBORN. Well, the lands are poor on the coast; they get better as you go inland. They do not get a ratoon crop on the coast lands at all; that is only done upon the new and fresher lands farther inland.

Colonel HILL. You never get more than one ratoon crop?

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Mr. WELBORN. Never to my knowledge; everybody here agrees upon that.

Colonel HILL. Have you visited the island of Negros yourself?

Mr. WELBORN. Yes, sir; three or four times.

Colonel HILL. What is considered the dry side of Negros—Occidental or Oriental Negros?

Mr. WELBORN. Well, I have never been in Oriental Negros; I do not know enough about that. There is no sugar grown in Oriental Negros. The conditions are about the same on both sides of the island; however, I should say one side is as dry as the other.

Colonel HILL. Why is there no sugar grown in Oriental Negros?

Mr. WELBORN. Well, I do not know; probably it is poor land; in fact, I have been told that the land over there is poor.

Colonel HILL. Is that due to lack of water?

Mr. WELBORN. Possibly so, but I rather think it is due to the fact that the land is not fertile; I have heard so.

Colonel HILL. Have you never heard it compared with Hawaii as being similar to the dry lands in Hawaii?

Governor-General WRIGHT. My information is that there are no arid lands in the Philippines. The northeast monsoon affects the lands during one-half of the year and the southwest monsoon during the other.

Commissioner WORCESTER. There are no arid lands in the island of Negros. The rainy season comes at opposite times on the two sides. However, there is a small district near Bais, in Oriental Negros, where cane is grown and where the conditions are about the same as at Bacolod. There is no irrigated sugar land in the Philippine Isinads and never has been.

Mr. WELBORN. As proof that it is not arid, there is a good deal of hemp grown there.

Commissioner WORCESTER. One reason why there is more sugar in Occidental Negros than in Oriental Negros is that in the latter there are large amounts of timber land. The cost of clearing is very high—in fact almost prohibitive. The last time I was in Oriental Negros, some thirteen years ago, there were very extensive forests to the east of the mountains between Bais and Dumaguete.

Colonel HILL. In regard to the expected return to be made to the United States by reason of the remission of duties—that is, by the increase of trade to the extent of many millions—what do you mean by that?

Mr. WELBORN. Well, I had in view the United States increasing her exports of cotton goods, iron products, food stuffs, etc.

Colonel HILL. Well, do you know whether, in the Philippine Islands, any effort has been made on the part of the American manufacturer to find out the style of article desired by the Filipinos?

Mr. WELBORN. Well, I believe that to be a great difficulty with many of them.

Colonel HILL. They are following the same practice here that they did in Cuba?

Mr. WELBORN. Yes, sir; they think that the American style is the best in the world. I think that they should begin to study the wants of the Filipinos, so as to be ready to extend their trade here by 1909, when the ten years' clause of the treaty of Paris will have expired and the bars can be put up aganist foreign countries.

Colonel HILL. In regard to plows; have you ever tried to introduce the "Fowler" plow from England?

Mr. WELBORN. No, sir.

Colonel HILL. Do you know what effect deep plowing of the land would have in producing ratoon crops?

Mr. WELBORN. I became interested in that subject this year and had one piece of cane land trenched 18 inches deep. I have a standing reward of $5 for anyone who can show me the trenched land from that plowed 5 inches deep, by the growth of cane. Nobody has gotten the reward. The deep plowing seems to be no better than the shallow plowing.

Colonel HILL. When was that done?

Mr. WELBORN. In December, just before planting.

Colonel HILL. You do not know whether that would produce a ratoon crop or not?

Mr. WELBORN. No, sir.

Senator NEWLANDS. Mr. Welborn, in your observation of the agricultural holdings of the Philippines, have you noted whether the land is held in very

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large estates and leased to tenants or whether it is held in small holdings and cultivated by the owners?

Mr. WELBORN. Well, it is in all sorts of ways. In Pampanga I believe the prevailing system is to have tenants and divide the crop—give each man a tract of land and have him cultivate it and then divide the proceeds.

Senator NEWLANDS. That is the case with sugar lands?

Mr. WELBORN. Yes, sir.

Senator NEWLANDS. Will you please specify what the rule is as to large or small holding of the different classes of agricultural lands—sugar, tobacco, and hemp?

Mr. WELBORN. Well, so far as I know and believe, there are two extremes. There are perhaps 10 per cent of what you would call large estates, and then 10 per cent of medium-sized estates, and the balance very much split up, so that the average-sized farm in the Philippines is about 6 acres, and 45 per cent of the farms is cultivated. The average-sized farm in the Philippines is the smallest of any country I have ever heard of.

Senator NEWLANDS. Now, you suggest that a corporation should be allowed to own 5,000 acres for a sugar estate. How many workmen would be needed on such an estate?

Mr. WELBORN. I do not know, because I have never run a plantation of that size.

Senator NEWLANDS. You estimate one man to the hectare, do you not?

Mr. WELBORN. That is the way they work now; but if I had that plantation and one man did not work more than a hectare of land I would get out of the islands.

Senator NEWLANDS. Is it your understanding that a corporation having 5,000 acres would employ 3,000 men? How many would be needed on an estate of that size in Hawaii?

Mr. WELBORN. The Hawaiian reports never make statements upon that point. They say how much it costs to plant, cultivate, and grind the cane, but they never make a statement as to the number of hands.

Senator NEWLANDS. How many men would you expect to employ on an estate of that size?

Mr. WELBORN. It would be a mere guess; I could not say.

Senator NEWLANDS. Well, the purpose of my question is this: My observation in the Hawaiian Islands has been that there is a very large population attached to each estate—a large number of Japanese and Chinese—who occupy small villages upon the estates. Now, these men have no interest in the soil; they are employed there in a capacity that does not train them for duties of citizenship. Now, with our plans for these natives—the plans we have for bettering them—I ask you whether, were we to permit these large plantations and large numbers of laborers attached to the soil, we would develop them in the duties of citizenship and in their capacity for self-government—and let me call your attention to the fact that for every laborer employed you will have a wife and a family of three or four at least, so for 2,000 laboring men you would have a population of 7,000 or 8,000 people.

Mr. WELBORN. My own view is that sometimes you have to take the least of two evils. These people cultivate land now in smaller parcels than I have ever heard of elsewhere. I have inquired particularly with reference to investment, and I have not found people particularly anxious to sell; they seem to want to hold on to what they have. They have gotten an idea, I think, that we Americans have got a lot of money, and as soon as anyone talks about purchasing their prices go up.

Secretary TAFT. I should like to ask, if a company came in here to manage 5,000 acres and did not lift up and improve their laborers and treat them with consideration, whether they might not count on losing money?

Mr. WELBORN. Well, I certainly believe in that principle. I should certainly feel that I was putting money into my pocket to care for them properly and feed them well, with a view to making a profit in the long run. I would teach them means of keeping well and of improving themselves. Whether every proprietor would feel like I do upon that point, I do not know. I am certain that you would not be able to buy up the whole country, however. These people hold on to their lands.

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[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States Senate, p. 1038.]

STATEMENT OF GEORGE BRONSON REA, EDITOR OF THE FAR EASTERN REVIEW.

Cost of production.

* * * * * * *

Señor Jose Puig is owner of sugar hacienda "Ynaun," located at San Fernando, Pampanga. The depth of soil on his estate averages 3 feet, and is plowed to a depth of 6 inches. The lands, like most of those in Pampanga and the plain extending northward from Manila Bay, are about at sea level, being so low that proper drainage is impossible, so that with a wet season the water remains on the ground and drowns out the growth of the cane. This condition, existing up to above Angeles, is a disadvantage, which in the course of time will kill the cane industry in Pampanga and bring the lands under rice cultivation, for which nature has adapted them. The wage system under which Mr. Puig operates his estate is as follows: The owner supplies the land, house, carabaos, plows, and seed, and other tools and necessities, and the colono receives in return one-half of the product in rice and one-half of the sugar, less 10 per cent for the cost of manufacture. During the season the colono receives a monthly advance of 5 to 7 pesos to meet his minor necessities. Under this system it is extremely difficult to arrive at any fair rate of wage, as the accounts of both sides are a tangle which would puzzle a "Philadelphia lawyer." Now, this system is similar to what obtains in Cuba under the central factory system; where the factory owns the land. The average price paid to the independent farmer in Cuba for his cane delivered at the mill is 5 per cent of the weight in sugar, or its equivalent in cash at the current market price. When, however, the factory owns its lands, and labor is scarce, they make a contract with a farmer to cultivate so many acres, supplying him with land, seed, cattle, tools, carts, and money advances, and pay for the cane at the same rate as paid to the independent farmer, and divide the returns with their colono, and yet there is no complaint made there that the colono is enslaved. He can break the bargain whenever it becomes unprofitable to him or whenever the factory fails to carry out its part of the contract.

Under this share system, as obtains in Pampanga, the actual cost is only known at the end of the season by the difference between expenses and receipts, and last year, when sugars sold at an average of ₱6 per picul, the planters acknowledged to have made a little money.

For instance, Mr. Antonio Consenja, owner of the hacienda "Magliman," at San Fernando, admitted that last year he made ₱1,500, which really was not a profit but simply the amount left to him as overseer and manager of his own estate and factory. This is a sample small mill. His plantings were sixty balibas, or acres, which yielded 900 piculs of sugar, an average of 15 piculs per baliba. The cane is planted in rows 2½ feet apart and 1 foot between seed, and he never had a ratoon crop. The mud from the beds of the rivers is dredged out and scattered over the lands to serve as a fertilizer. His factory equipment is a small 6-horsepower 3-roller mill and engine, with three open batteries of five kettles each. His estimated cost was difficult to ascertain, but he opened his books in the presence of the governor of the province, which showed that his apparent profit on 900 piculs, at an average selling price of ₱5.50 per picul, was ₱1,500. In other words, he had this amount as between his expenditures of ₱3,450 and his receipts of ₱4,950, or an average cost of ₱3.63 per picul, which did not include any salary for himself or allow for loss in cattle, interest, etc.; so it can be fairly estimated that his cost was ₱4 per picul.

Mr. Joaquin Lingiano, of the haciendo Santo Tomas, at San Fernando, testified to me in the presence of the governor that he had planted the year previous 120 balibas, from which he had secured a crop of 1,200 piculs, or 10 piculs

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per acre, or 1,375 pounds of sugar, and in bad years it was much less. His outfit was a little 6-horsepower mill and engine, with four batteries of kettles, averaging 30 piculs a day output. His accounts showed that he had sold his crop at an average price of ₱5 per picul, or a total of ₱6,000, and his apparent profit had been about ₱1,200, or ₱1 per picul. As he was working on the share system, it was pointed out that one-half of this profit went to the colono.

Mr. Juan Nepumaceno, operating a small steam mill at Angeles, stated that for the crop of 1905 he had planted 220 balibas of land, from which a crop of 2,520 piculs had been secured, or something like 11 piculs per acre, or 1,507 pounds. His books showed that he had received an average price of ₱6 per picul, or a total of ₱15,120, and acknowledged to have made a profit of ₱3,000, or a cost of something like ₱4.80 per picul. His lands have to be planted alternately with rice and sugar, so he only secures a crop of sugar every two years. This yearly planting would naturally raise the cost somewhat.

* * * * * * *

Average cost in Pampanga.

[From data secured by George Bronson Rea.]

Lands under cultivation (approximate).

Yield of Muscovado sugar per "balita," maximum 20 piculs, minimum 15 piculs.

Crop of 1904, 2,100 piculs or pilones.

Value of lands, based on yield of 15 piculs = ₱40 per balita.

PLANTING EXPENSES.

Plowing 1 balita, 1 man and 2 carabaos, with native plow, average ₱2 per time, 5 plowings, at ₱2	₱10.00
Harrowing, 2 times, at ₱1	2.00
Furrowing, 1 time, at ₱1	1.00
Drainage ditches	3.00
Planting 10,000 points	2.00
Hoeing and weeding	7.50
Total	25.50
Yield of balita, 15 piculs; cost per picul	1.70

CUTTING CANE.

Work paid for on basis of each 10 piculs of sugar manufactured at mill, called a tarea or task, per task	.75
Food cost for above	.20
Cartage to mill, per task	1.00
Food cost for above item	.40
Total	2.35
Cost per picul	.235

MANUFACTURING EXPENSES.

Capacity of mill, 35 piculs per day.

Average day's work, 30 piculs per day.

Engineer (salary), per month	30.00
Fireman (salary), per month	15.00
Total	45.00
$\frac{₱45}{25 \text{ working days} \times 30 \text{ piculs per day}}$, per picul	.06
Mill men: 10 men, at ₱0.12½ per task and food, and 10 men in a shift, at ₱0.20 per day and food $= \frac{10 \text{ times } ₱0.125 + \text{ten times } ₱0.20}{30} =$	.11
Sugar boiling: ₱2 per task, or ₱0.20 per picul	.20
3 men to battery × 6 batteries = 18 men; 2 sugar boilers = 20 men × ₱0.20 = ₱4 food cost $\frac{4.00}{30}$ = per picul	.13⅓

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Six firemen for six batteries (wage, 0.30 + 0.20 food = 0.50), six times 0.50 = 0.10 per picul	₱0.10
Fuel, ₱4.50 per day = per picul	.15
Hauling to town, per cartload of 7 piculs = ₱2.00 = 0.285 per picul	.285
Food of engineer and firemen	.013
Pilon (container)	.50
Lima and oil	.05
Freight to Manila	.20
Planting expenses	1.70
Cutting and hauling	.235
Manufacturing	.766
Hauling to town	.285
Container	.50
Lima and oil	.05
Freight to Manila	.20
Overseer or owner's wages at ₱150 per month = ₱1,800 per year = $\frac{1,800}{2,100}$ = per picul	.85
$\frac{4.58}{137.5}$ = per pound = ₱0.033, or United States currency, $0.016 per pound	4.58

COSTS IN NEGROS.

Now I want to submit a fair sample of detailed cost of making sugar in the island of Negros, and call your attention particularly to just where the opposition have made their error and also where the average Filipino planter errs in computing his actual costs.

In Negros the unit of land measure is known as the "lacsa," comprising 10,000 plants or stands of cane on a plantation. When crops are good a "lacsa" of new land will produce an average of 30 piculs, when poor about 15 piculs, while on the older lands the general average is about 16 piculs, or 1 ton. There are 3 "lacsas" of cane seed to 1 hectarea of ground, or equal to five-sixths of an acre.

There are some new lands that give still better results, and there are others that fall far short of this average, but generally speaking, 20 piculs per "lacsa" in what are classed as average harvests. On this fair average basis we will make an estimate for a plantation of 200 "lacsas," a 4,000-picul harvest, commencing with the expense of cultivation, milling, packing, and transportation, until the product is placed on sale in the market for the farmer, or, in other words, in the port of Iloilo, and it must be remembered that though the work of preparation is usually less costly in soft ground, there are other lands on which the expenses run much higher than those which are here set forth:

Planting and cultivation.

[Expenses per "lacsa."]

Four preliminary workings of ground	₱12.00
Planting or seeding	4.00
Three plowings and cleaning of plants	13.00
One final working	5.00
Total	34.00

The ₱34 for expenses of cultivation per "lacsa" will give us ₱1.70 per picul.

Cutting and manufacture.

[Expenses per picul.]

Cutting and carting of cane	₱0.35
Sun drying of bagasse	.10
Ovens and mill	.27
Total	.72

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Packing and transportation, etc.

[Expenses per picul.]

Bags and rattan	₱0.13
Packers	.02
Carting to wharf	.25
Lighter transportation	.20
Expenses of delivery in Iloilo	.10
Agent's commission, Iloilo	.10
Total	.80

SUMMARY.

Cultivation, per picul	₱1.70
Milling, per picul	.72
Transportation, per picul	.80
Total	3.22

Or an apparent cost of ₱2.30, or $1.15 per 100 pounds.

Now, if we rest on this as the final or absolute cost we would be greatly deceived, as much deceived as the planter who stops here with his details. It is true that the above is a fair average of general expenses, for in a reunion of planters held at Bacolod under the direction of the provincial governor they all more or less agreed on the point that the cost to plow, plant, and cultivate a "lacsa" would average ₱34, and I also ascertained, by a practical example on Señor Luzuriaga's estate, that the cost of cutting, hauling, and manufacturing was 80 cents per picul, by contract, as that was the price agreed upon with the contractor under which the crop was being harvested. In Mr. Luzuriaga's case I figured his bare costs down to ₱2.50 per picul, but, as in the estimate submitted, there are many other items which have been omitted entirely—the salary and maintenance of the manager and the permanent salaried force, oil, light, expenses of the plantation house, veterinary charges, repairs, commissions to labor contractors, loss of cattle, and other minor legitimate and necessary items. Without going into all of these, but just taking up the most prominent, we find on revision of the above as follows: A plantation to produce 4,000 piculs, with the expenses already noted and the following, will be:

Costs of 4,000 piculs, as indicated, at ₱3.22	₱12,880
Salary of manager	1,000
Salary of assistant	480
Maintenance of above, at ₱50 per month	600
Four outside foremen, at ₱15 per month	720
Maintenance	288
Rice for laborers (500 piculs, at ₱5.50)	2,750
Light, oil	60
	18,778

Or a cost per picul of ₱4.69.

And yet we have failed to include interest, repairs, depreciation, taxes, and other legitimate charges which are always difficult for any outsider to secure, but the above is ample corroboration of the costs as advanced by those interested in this measure, and it will be seen all the way through that the wages are kept way low, with the rates prevailing in other years.

And yet we have failed to provide for the loss of cattle through epidemic diseases.

* * * * * * *

DOCTOR WILEY'S LETTERS ON PERCENTAGE OF SUGAR SECURED IN THE PHILIPPINES.

STATEMENT OF CONDITIONS ATTENDING THE MANUFACTURE OF CONCRETE IN THE PHILIPPINES—REAL AND HYPOTHETICAL DATA.

1. The juice expressed from the sugar cane in the Philippines has a density of 19° Brix.
2. The percentage of extraction is 50 per cent by weight of the cane.
3. The juice is concentrated without previous defecation in open kettles, lime being added to the juice in the first kettle.

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4. Concentration is continued until the sugar in the finishing kettle contains only about from 5 to 10 per cent of water. The finished sugar is removed by buckets and placed in crystallizing tanks where, as it crystallizes, it is stirred with spades.

5. The finished product is not drained of its molasses, but is sold as concrete.

6. The average polarization of the concrete is 83.5, though it sometimes falls as low as 71.

The problem, then, is as follows:

One hundred pounds of cane furnished 50 pounds of juice containing 19 per cent of solid matter. The percentage of sugar in this expressed juice may safely be placed at 17 where the Brix is 19°. The juice thus has a purity of about 89. If no inversion nor caramelization should take place, the concrete formed would have the same purity, namely, 89, and its polarization, if free of water, would be approximately 89°.

The total weight of solid matter, of course, would be 9.5 per cent of the weight of the cane, less the loss in skimmings and plus the percentage of water. I understand from Mr. Welborn that the loss in skimmings is not over 3 per cent, which would leave 9.2 per cent of the weight of the cane in the concrete. The concrete will contain, say, an average of 5 per cent of water, and thus would represent 9.7 per cent of the weight of the cane.

A ton of cane, therefore, or 2,000 pounds, would make 194 pounds of concrete. As this concrete polarizes 83, it will contain in round numbers 160 pounds of pure sugar. The juice polarizing 17° from a ton of cane would contain 170 pounds of sugar. Thus, the total quantity of sugar inverted and caramelized during inversion would be 10 pounds, not nearly so much as I assumed in my former calculation, based on the supposition of a much higher caramelization than takes place under the present supposition.

I regret that a misunderstanding of the hypothetical and actual data resulted in the calculations of my first letter.

Respectfully, H. W. WILEY, *Chief.*

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF CHEMISTRY,
Washington, D. C., January 25, 1906.

Mr. GEO. BRONSON REA,
New Willard Hotel, Washington, D. C.

DEAR MR. REA: In compliance with your request I make the following statements respecting the hypothetical problem which you submit, as follows:

1. The juice expressed from the sugar cane in the Philippines has a density of 19° Brix.

2. The percentage of extraction is 50 per cent by weight of the cane.

3. The juice is concentrated without previous defecation in open kettles, lime being added to the fresh juice in the first kettle.

4. Concentration is continued until in the last kettle crystallization takes place, the contents of the kettle are stirred by means of a spade, and the molasses apparently disappears, the temperature for evaporation of the last kettle being necessarily high, this kettle being placed presumably over the hottest part of the fire.

5. The finished product is drained and the resulting muscovado sugar has a polarization of 88°. Question: What would be the probable yield of muscovado sugar on the weight of the cane ground? It will be necessary to assume a number of conditions in the discussion of this problem. The most important of these is the polarization of the juice, which is not given as one of the conditions above mentioned. It is safe to assume that in a juice of tropical sugar cane of 19° Brix the polarization will be 17°—that is, it will contain 17 parts of cane sugar per 100. This will net a purity, in round numbers, of 88. One hundred pounds of cane will yield 50 pounds of juice containing 8.5 pounds of sugar. During the process of skimming and transferring from kettle to kettle three-tenths pound of sugar will be lost, leaving a total of 8.2 pounds of sugar.

By reason of the neutralization of the acids of the cane juice with lime the quantity of inversion during boiling is reduced to a minimum. It will probably not exceed 1 pound, which will leave in the finished product 7.2 pounds of sugar. A considerable quantity of this sugar will be caramelized in the last kettle by reason of the high temperature of the boiling. The maximum degree

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of caramelization, however, will not exceed 1 pound, leaving 6.2 pounds of sugar for 100 pounds of cane. On draining after concentration not to exceed 1 pound of sugar will be withdrawn with the molasses, leaving 5.2 pounds of sugar from 100 pounds of cane. As this sugar polarizes only 88, 5.2 pounds of pure sugar will represent 5.9 pounds of sugar, or, in round numbers, 6 pounds.

It thus appears that 6 pounds of muscovado sugar polarizing 88 will be obtained from every 100 pounds of cane, or 120 pounds of sugar for each ton of 2,000 pounds. * * *

Respectfully, H. W. WILEY, *Chief.*

[From Report of the Philippine Commission, 1906, part 2, p. 169.]

SUGAR CANE.

Some experiments in cane culture were carried on at Manila. Five leading varieties of cane coming to us from Honolulu were tested for yield and saccharine content. This cane had been planted early in the dry season, was well fertilized, and well worked. By September it had attained very much more than the usual size; in fact, it had become so large that it suffered much more than cane of the usual size from the great typhoon of September 26, 1905. We found that it was so broken and twisted that the experiment was worthless. The average yield when harvested indicated 24 tons per acre. The laboratory results showed that none of it would have been profitable for milling. This arose from the damaged condition of the cane and sprouting and new growth that set up after the damage. A part of this experimental patch was prepared by trenching 18 inches deep and the balance by plowing about 5 inches deep. No difference could be observed in the growth of the crop. Another planting of cane was made in June, 1905—an unusual time for this country—to see if it could be carried through two wet and one dry season, aided by irrigation, and mill at end of last wet season, and thus lengthen the usual grinding season. This cane is now fourteen months old and has not flowered. I think it will not flower until the end of the wet season, bringing it up to sixteen or seventeen months of age. But another trouble has been encountered. It has grown tall, with thin stalks. With the advent of the rains the tops became quite heavy. It has already been severely injured by one typhoon, and it is quite likely that the next one will spoil it so it would not be worth milling. It is now my opinion that in most of the islands cane will have to be planted so as to ripen in twelve months, and even then fertilizing and irrigating so as to stimulate extraordinary growth may prove unprofitable on account of our severe storms.

Several imported varieties have shown greater vigor than the cane long grown. These differences were exaggerated, too, by the fact that the new canes were planted early, fertilized, and given a better chance. They showed a tendency to ripen later and to have less sugar in juice. These tendencies would be a natural result of the fertilizing, etc., so there is probably less difference in value of the varieties than most men have believed from looking at the canes. Other sugar-cane experiments are in progress, but no results can yet be announced.

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TOBACCO.

[From Census of Philippine Islands, 1903, vol. 4, p. 32.]

TOBACCO.

In point of commercial importance tobacco is the third agricultural product of the islands.

The relative value of tobacco exports, leaf and manufactured, varied year by year, ranging from 3.28 per cent in 1881 to 27.09 per cent for the five months in 1898, for which statistics are in existence, and averaged, for all the years reported, 12.43 per cent of the total value of exports.

The plant is of American origin and was originally introduced into the Philippines from Mexico by Spanish missionaries in the latter part of the sixteenth century shortly after the establishment of Spanish sovereignty; recently certain varieties are supposed to have been introduced from the United States.

The species (*Nicotiana tabacum*) embraces a wide range of varieties, a large number of which are produced in the Philippines, which are classified into two groups known, respectively, as "tobacco from old seed" and "tobacco from new seed." The first group consists of varieties having elliptical or ovate, wide or heart-shaped leaves, and the second of the kinds bearing lanceolate, narrower leaves than those of the first group. The tobaccos of the second group are believed to be from seed imported from the United States.

From the time of its introduction until 1781 slight attention was paid by the Spanish Government to tobacco production in the islands, and its exclusive right to traffic in the product was not enforced until that year, when the production and sale of the article were formally made a State monopoly, as far as the island of Luzon was concerned. The Visayan and other islands south of Luzon were not affected by the Government monopoly, and their tobacco growers were always free to sell their product either to the Government or privately, as they saw fit.

The monopoly of the Government in the island of Luzon remained in existence for one hundred and one years, and was terminated December 31, 1882. During its existence it became an important source of revenue, and in its last year, 1882, yielded profits amounting to about 50 per cent of the total budget expenditures of the Philippine government.

Notwithstanding the maladministration, crying abuses, and practical slavery that had grown up under the monopoly system, which finally led to its abolition, the native tobacco growers opposed its discontinuance, having become accustomed to its workings and fearing that a private monopoly of tobacco speculators would result in the imposition of evils harder to bear than those to which they were already subjected. For several years prior to 1882 the question of abolishing the monopoly was under consideration by the Government; the clergy joined with the growers in opposing the measure, and were able to defeat its adoption for a time, but the evils of the system were so overwhelming as to finally secure its termination in spite of all opposition.

With the inauguration of freedom of production and sale, the tobacco industry took on a new impetus, and since 1882 the annual shipments of both leaf and manufactured tobacco have considerably exceeded those of the monopoly period; the number of cigar factories has increased, as well as the number of persons employed in tobacco production and manufacture. There is an enormous home consumption of cigars and cigarettes throughout the archipelago, and this, added to the demands of the export trade, renders the industry one of the most important of the islands.

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The best qualities of tobacco are grown in northern Luzon, particularly in the provinces of Cagayan and Isabela, where the production is larger than elsewhere. Considerable quantities are also grown in other provinces of Luzon—Ilocos Norte, Ilocos Sur, Nueva Ecija, Nueva Vizcaya, Pampanga, and elsewhere—while the Visayan and other southern islands yield the plant in appreciable quantities, though of generally inferior qualities.

A description of the cultivation and preparation of tobacco for market, together with other data regarding the handling and marketing of the crop in the province of Cagayan, Luzon, where the largest quantities of the higher-grade qualities are produced, are given in the following special report:

[From hearings before the Committee on Ways and Means, House of Representatives, January 23–28, and February 3, 1905, p. 148.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 27, 1905.

STATEMENT OF COL. C. R. EDWARDS.

* * * * * * *

Exportations of tobacco from the Philippine Islands during the calendar years 1880 to 1904, showing shipments to the United States as compared with the total exports of tobacco from the islands.

[Data for years 1880–1894 compiled from official returns of the Spanish Government, as contained in the publication "Estadistica General del Commercia Exterior de las Islas Filipinas." Data for years 1899–1904 compiled from official returns of the insular Bureau.]

Calendar year—	Leaf tobacco.				Cigars, cigarettes, etc.		Total.	
	United States.		Total.					
	Quantity.	Value.	Quantity.	Value.	United States.	Total.	United States.	Exports.
	Pounds.		*Pounds.*					
1880	4	$23	915,453	$331,536	$960,091	$1,897,042	$960,114	$2,228,578
1881	132	2,003	3,329,007	594,141	14,935	123,132	16,938	717,273
1882	110	17	12,448,953	1,958,928	478	387,909	495	2,346,837
1883	1,619	448	7,405,506	1,240,429	2,350	1,343,958	2,798	2,584,387
1884			2,742,234	482,736	4,289	1,104,192	4,289	1,586,928
1885	33	3	12,829,034	1,288,955	2,092	1,008,408	2,095	2,297,358
1886	101	53	11,218,280	759,931	1,004	1,250,162	1,057	2,010,093
1887	565	108	9,435,895	640,699	17,343	918,371	17,451	1,559,070
1888	70	31	21,431,632	1,340,314	10,115	1,108,911	10,146	2,449,225
1889	2,132	207	20,105,054	1,404,754	17,559	850,740	17,766	2,255,494
1890	5,300	247	19,403,096	1,320,752	5,594	1,148,281	5,841	2,469,033
1891			19,950,300	1,258,743	2,811	891,563	2,811	2,150,306
1892	2,226	150	26,700,014	1,554,264	405	981,476	555	2,535,740
1893	1,417	98	23,638,105	1,463,853	2,211	969,451	2,309	2,433,304
1894			15,442,057	702,922	1,018	873,253	1,018	1,576,175
1895 [a]								
1896 [a]								
1897 [a]								
1898 [a]								
1899			14,050,310	776,841	3,405	1,154,412	3,405	1,931,253
1900	110	7	22,028,546	1,033,900	5,662	1,227,332	5,669	2,261,232
1901			17,391,595	748,485	984	1,883,456	984	2,631,941
1902	235,420	41,538	20,196,283	955,166	11,000	1,007,458	52,544	1,962,624
1903	9,168	790	19,249,094	954,259	1,903	992,616	2,693	1,946,875
1904 [b]			16,443,430	861,073	878	873,387	878	1,734,460
Annual average:								
1880–1884	373	498	5,368,231	921,554	196,428	971,246	196,926	1,892,800
1885–1889	580	80	15,003,979	1,086,931	9,623	1,027,317	9,703	2,114,248
1890–1894	1,989	99	21,026,714	1,260,107	2,408	972,805	2,507	2,232,912
1899–1903	48,949	8,467	18,583,165	893,730	4,592	1,253,055	13,059	2,146,785

[a] Figures not available. [b] Ten months ending October 31, 1904.

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Market quotations for Philippine tobacco, from the Daily Bulletin, Manila, December 12, 1904.

Leaf tobacco.	Price per quintal (101.44 pounds).
Isabela, 1901, first to fifth class	$15 to $42
Cagayan, 1901, first to fifth class	11 to 38
Isabela, 1902, first to fifth class	16 to 36
Cagayan, 1902, first to fifth class	10 to 32
Brfif:	
First class (few stocks offered)	13.50
Second class	11.00
Third class	9.50

Export price of Philippine tobacco according to cable advice from the civil governor, dated Manila, January 20, 1905.

	Price per pound (gold).
	Cents.
Wrapper tobacco	30
Filler tobacco	10
Smoking tobacco	7.5

These tables have been compiled out of a lot of data, and they may save the committee a little work, if they are not original.

* * * * * * *

Colonel EDWARDS. Then here is a chart showing the exports of tobacco for the Philippine Islands since American occupation, crude and manufactured. I will submit that, Mr. Chairman, and whether it ought to be printed or not is to be determined. Two or three members of the committee have asked me for information upon the exports of the tobacco from the Philippine Islands to the countries mentioned during the fiscal years 1899–1904 for leaf tobacco, cigars, cigarettes, and others, manufactured. This table has just been worked out, and therefore I think will be useful to the whole committee. It will be found at the conclusion of this statement.

Also inquiries have been made of me as to the import duties charged by foreign countries on the Philippine tobacco and its manufactures sent to Germany, Austria-Hungary, China, etc., and I have dug that information out of the respective tariffs of those countries and had them translated, and they will probably be of use as they are reduced to United States measure.

Import duties charged by foreign countries on Philippine tobacco and its manufactures.

The bulk of Philippine tobacco and its manufactures exported is credited to the United Kingdom, Germany, France, Spain, Austria-Hungary, Netherlands, China, Japan, British East Indies, Dutch East Indies, and Australia. The import duties levied on tobacco in its various forms by these countries are given below:

UNITED KINGDOM.

Tobacco, unmanufactured, containing 10 pounds or more of moisture in every 100 pounds of weight thereof	per pound	$0.79
Tobacco, unmanufactured, containing less than 10 pounds of moisture in every 100 pounds of weight thereof	per pound	.87
Cigars	do	1.46
Cigarettes	do	1.17

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GERMANY.

Tobacco in the leaf, unmanufactured	per pound	$0.092
Tobacco, manufactured, leaves wholly or partly stripped; waste of manufactured tobacco leaves	per pound	.195
Tobacco stalks and ribs	do	.092
Tobacco, chewing, and snuff	do	.195
Cigars and cigarettes	do	.292

FRANCE.

Tobacco, in leaves or stalks:	
For the Regie	Free.
For private account	Prohibited.
Tobacco, manuactured, for the Regie	Free.

NOTE.—Limited quantities of manufactured tobacco, not to exceed 22 pounds per consignee per year, may be imported for personal use under a special tariff.

SPAIN.

Cigars of foreign manufacture Regie duty	per pound	$2.63
Cigarettes Regie duty	do	1.43
Cut tobacco, Regie duty	do	1.43

NOTE.—The tobacco monopoly may clear through the customs manufactured tobaccos for private persons, but with a further tax of from 12 to 25 per cent ad valorem, according to class of manufacture.

AUSTRIA-HUNGARY.

Tobacco, unmanufactured (imported by special permission)	per pound	$0.046
Tobacco, manufactured (imported by special permission)	do	.115

NOTE.—In addition to the duty, the following licensing tax is to be levied for every pound of the net weight paying duty:

Cigars and cigarettes	per pound	$2.03
Other manufactured tobacco	do	1.55
Unmanufactured tobacco	do	1.29

NETHERLANDS.

Tobacco:		
In leaves, rolls, and unflattened ribs	per 100 pounds	$0.13
In leaves, rolls, and flattened ribs	do	.274
Cut, snuff, and other manufactures	do	2.193
Cigars	do	7.31

CHINA.

Tobacco:		
Leaf	per 100 pounds	$0.43
Prepared, in bulk	do	.51
Cigarettes:		
First quality (exceeding $3.24 per 1,000 value)	per M	.36
Second quality (not exceeding $3.24 per 1,000 value)	do	.07
Cigars	do	.36

JAPAN.

Tobacco, leaf, ad valorem	per cent	70
Cigars and other manufactures, ad valorem	do	300

NOTE.—This includes war tax of 100 per cent on previous tax.

BRITISH EAST INDIES.

Tobacco:		
Unmanufactured		Free.
Manufactured, ad valorem	per cent	5

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DUTCH EAST INDIES.

Western Borneo:		
Tobacco, smoking, and snuff	per 100 pounds	$1.466
Manila cigars	do	36.54
Other cigars and cigarettes	do	9.13
Residency of east coast of Sumatra:		
Tobacco—		
Chinese	do	2.20
Manila and Habana	do	5.50
Snuff	do	7.31
Cigars, Manila and Habana	do	36.54
Other cigars	do	9.13
Territory of Lobok:		
Tobacco (as unenumerated goods and not in list of exceptions), ad valorem	per cent	4

AUSTRALIAN COMMONWEALTH.

Tobacco:		
Manufactured	per pound	$0.79
Unmanufactured	do	.79
Unmanufactured, but entered to be locally manufactured into tobacco, cigars, and cigarettes, to be paid at the time of removal to the factory	per pound	.36
Cigars, 15 per cent ad valorem and per pound		1.52
Cigarettes	per pound	1.57
Snuff	do	1.57

NOTE.—In addition to the above duties excise charges are assessed as follows:

Tobacco, manufactured	per pound	$0.24
Cigars	do	.36
Cigarettes	do	.73
Snuff	do	.49

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[Same Hearings Page 205.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

* * * * * * *

Now, coming to tobacco. It is produced for export chiefly in three provinces, the province of Cagayan, which is the northeast province of the island of Luzon; the province of Isabela, which is immediately south of Cagayan. These are the two provinces constituting what is called the valley of the Cagayan River. The Rio Grande del Cagayan, the largest river in the islands, runs through these two provinces and overflows its banks, and the rich tobacco land is in that part of the valley which is overflowed. The two provinces are very sparsely settled, the ratio of men to the mile being less in those two provinces, I think, than in any other province in the islands excepting possibly Mindanao and Samar.

Tobacco is also raised for export in the province of Union. And probably tobacco may be exported also from the other three provinces of Ilocos Sur and Ilocos Norte and Abra. Those are the only provinces that raise tobacco for export at all. The arable land in the Ilocos provinces is narrow, lying between the coast range which comes quite near to the seashore; and the tobacco in those provinces is planted in the narrow river valleys that come down from the mountains between the hills. In Cagayan and in Isabela there is a very considerable territory that could doubtless be opened up for tobacco culture, but it is a territory that is covered with a dense forest, so it will require the expenditure of a great deal of energy to spread that culture. Isabela has 5,000 square miles and 3,000,000 acres, with a population of 76,431. Cagayan has an area

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of 5,000 square miles, 3,000,000 acres, and a population of 156,000. Ilocos Sur has 475 square miles and 371,000 acres and 187,000 people. You will observe that is a very much more populous province than the others. Ilocos Norte has 1,330 square miles, 851,000 acres, and a population of 878,000 people.

The Ilocanos are the most industrious people in the islands, but the residents of Isabela and Cagayan, the two great tobacco provinces, are probably the laziest people in the islands. There are among them some Ilocanos who have come from across the mountains and settled in that valley. The Cagayan Valley is possibly the place where we expect to make a great development by the construction of railroads. But the labor problem will always embarrass us. It is in that valley that it is possible to raise one crop of tobacco and two crops of corn on the same land in the same year. The cultivation of tobacco, originally a monopoly, and in the hands of the Spaniards, and subsequently given up, is now almost wholly confined to small tracts cultivated by families. The cultivation of the plant is not scientific at all. There are three or four large haciendas in Isabela. The Tabacalera Company owns one hacienda; the government now owns one obtained from the Augustinians by purchase, and there are probably two or three German firms that have haciendas there, and upon these haciendas, or plantations, I assume, the only good tobacco is raised.

The governor of Cagayan, Señor Gonzaga, who is an expert in the tobacco business, has written a paper on the subject within the last year—the subject of the cultivation of tobacco in the two provinces of Cagayan and Isabela. With the permission of the committee I would like to submit it. He gives the history of its cultivation and shows that under present conditions, with the very large number of small tobacco farms, the attention to the plant in the way of keeping worms off the leaves and preparing leaves properly for market have led to a depreciation in the character of the tobacco produced.

Mr. GROSVENOR. What do you mean by keeping off the worms?

Secretary TAFT. The worms attack the leaf and eat a part of it.

Mr. GROSVENOR. That is the only feature of the cultivation of tobacco that has never been improved since I have known about it. They all have to be picked off by hand.

Secretary TAFT. Exactly. Where a man leaves it to the family he will usually not find the plants well tended. It is pretty hot in the Cagayan Valley, though comfortable under the trees. There is no European or American head to see to it that the work is done. Ordinarily the leaf comes to market, therefore, in a defective condition.

The CHAIRMAN. In the United States they cover it over and conserve its quality.

Secretary TAFT. I understand they do that for the purpose of getting a wrapper leaf.

The CHAIRMAN. And they also do that for keeping parasites off the leaf.

Mr. TAWNEY. Can you give us any idea what proportion of tobacco land in those provinces that you have named are owned and cultivated by the natives, and what proportion is owned by outsiders—Americans, Germans, or English?

Secretary TAFT. Well, I should say 75 per cent.

Mr. TAWNEY. Owned by the natives?

Secretary TAFT. Yes.

Mr. TAWNEY. And cultivated by the natives?

Secretary TAFT. Yes, sir; the tobacco business in the islands is largely——

Mr. WILLIAMS. Before you go to that, I would like to ask, are there any worms or insects that attack tobacco in the Tropics that do not in the Temperate Zone?

Secretary TAFT. I am not advised. All I know is that the crop of insects in the Tropics is larger than the crop of anything else. The islands have suffered for the last three years most disastrously from the locusts; they have stripped rice fields and other fields bare. We had to pass a law putting every man, woman, and child under the control of the presidente and the governor of the province for the purpose of meeting that pest as a public danger.

We sent them out into the fields to drive out the locusts—you will remember that you gave us a $3,000,000 relief fund—out of this we bought rice to feed the natives while engaged in this work. And we were able to drive the locusts, before they became able to fly, into trenches. We sent our corrugated-iron sheets and placed them at one end of a field where the locusts were, then the whole population gathered together and drove them into the ditches at the foot of these plates, and then they were buried. They were then what is called loctones, mere leapers, not fliers. By using that extraordinary means throughout

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the islands this year the locusts have for a time been destroyed. But I am not prepared to say whether the locusts are tobacco consumers or not; I think not. But there are worms to which the plant is subject, and it is for that reason that they usually separate the tobacco plantation from the sugar plantation, because the sugar attracts all sorts of insects.

I was going to say that the reason for my answer—that about 75 per cent of the tobacco, probably a greater per cent, is produced from small farms—is that the tobacco business in the Philippines Islands is a business of buying. The Tabacalera Company, which is the largest, and a great many others have their buyers in every province, where tobacco is raised for export. These two provinces, the Isabela and the Cagayan, are full of buyers, and the oppression that we fear and try to avoid for the native is the oppression of the presidentes of the towns in insisting that the small tobacco planters shall sell to him, and he shall turn over to the company with a commission. We are constantly running into that kind of oppression and constantly removing the presidente because of his attempt to monopolize that which belongs to the small planters, and which in the aggregate in a town reaches a large sum. It is the purchase of tobacco on the small farms that makes a large part of the business in Manila.

Mr. COOPER. Is there any competition in the purchase of tobacco there?

Secretary TAFT. Oh, yes; the Tabacalera Company, which is the largest company, has the longest purse, and is the most successful; but there are other firms that are in the market purchasing, so that there is considerable competition.

Now, with reference to the price of tobacco, General Wright says that the wrapper leaf is worth in the Manila market to-day 30 cents, gold; and if you were to introduce it into this country at 25 per cent of the present tariff, making no charge for the freight, as I understand, it would bring it up to something like 76 cents; and he says the trade is of the opinion that the wrapper is all used in Manila factories and that none would come here under any circumstances. That would seem to be likely, because the local Connecticut wrapper sells for less, I believe, than 76 cents.

With reference to the filler leaf he says the price in the Manila market is 10 cents, and for smoking tobacco 7½ cents. That would, without charging anything for transportation at all, with the duty at 25 per cent of the Dingley rates, make the cost of the filler leaf here about 18 cents a pound. As I understand it, Ohio and Pennsylvania and other filler leaf is considerably less than that.

The CHAIRMAN. About 10 cents.

Secretary TAFT. Well, so that on the whole I think that there was no particular danger, except the danger which has been suggested here that the American people are going to change their taste and let in the Philippine tobacco instead of Cuban.

Mr. GROSVENOR. Do they export any tobacco now elsewhere than to the United States?

Secretary TAFT. They do not export any to the United States, and they export 19,000,000 pounds, 13,000,000 of which go to the tobacco monopoly countries of Europe. The rivalry which is feared, I understand, and with respect to which there is probably more basis than anything else in this discussion, is the fear with respect to cigars, because the cost of labor in Manila is considerably less per thousand for cigars than it is here. I understand that the perfecto cigar is a cigar of a certain size, volume of tobacco, and of certain shape. Now, the perfecto cigars made of a Habana filler by Cubans in this country costs for labor $34 and sell at $120 a thousand. That the same cigar made by regular hand work, as I understand it, costs for labor $17 a thousand, and is put on the market at $70. But the perfecto of the Philippines costs in Manila about $25 gold, and of that the labor is from $6 to $7 per thousand. The cost of this cigar laid down in the United States, not counting in the freight, but with the duty of 25 per cent, would amount to about $45 per thousand.

Now, then, the assumption that that would undersell Cuban tobacco—I mean Cuban cigars—is an assumption that I beg respectfully to dispute. I hope that the Philippine cigar will achieve a better reputation among American smokers after its exportation to this country than it has now. I have brought several thousands of cigars from the Philippines in ecstacy of Philippine enthusiasm, and have sent them to my friends who smoke, but the expression of thanks is for the courtesy, but not for the cigars; and while that may not indicate that the taste will not be formed for Philippine cigars, it nevertheless shows that time must be taken, and that they will not permit a rival cigar on the same

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level as the Cuban cigar, whether that cigar be made in this country or in Cuba.

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Tobacco is raised in nearly every province in the Philippine Islands, but it is not usually exported, except from the provinces I have named. It is of a poor character, but it is quite sufficient to make cigars as long as two feet and two inches thick, that hang from the roofs of the cabins and are used as family cigars, the mother, the father, and the children all taking a whiff when convenient. The truth is, that in the United States you calculate that one-half—that is, the female portion—do no use tobacco at all, and not, I suppose, more than 60 or 70 per cent of the male. In the Philippine Islands, of the 7,000,000, I suppose six-sevenths of the men, women, and children must be considered as active consumers of tobacco. And that creates an enormous demand—I mean enormous in proportion to the population—for the tobacco which is raised in the islands. It is only the better kind of tobacco that is exported; the rest is used for home consumption.

I should be glad to answer any questions so far as I may.

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[Same Hearings, page 211.]

Report of Governor Gonzaga.

[Introduced by the Secretary of War.]

THE CULTIVATION OF TOBACCO IN THE PROVINCE OF CAGAYAN.[a]

Cagayan, situated in the extreme north of the island of Luzon, enjoys a more temperate climate than the other provinces of the Philippine Archipelago. Surrounded by mountains covered with vegetation and crossed in all directions by rivers and estuaries, there is maintained in the soil by the frequent overflows an accumulation of those fertilizing agencies essential to agricultural purposes.

The implements and methods of agriculture used by the inhabitants of Cagayan for the cultivation of rice, wheat, tobacco, corn, cotton, vegetables, etc., are of the most primitive kind, as is the case in all the provinces of the Philippine Archipelago.

The plow used in the preparation of the fields is of Chinese model and origin, with narrow shares, shaped like wings, of a smaller size than those used in Europe. To this a carabao is hitched, the only work animal used by the Filipinos, perhaps by reason of its greater strength and endurance as compared with all other cattle of the country. In spite of this, the plow hardly penetrates the soil more than 10 centimeters in making furrows in irrigated lands used for the cultivation of rice, while in dry lands and fields intended for tobacco the farmer finds it necessary to cross the ground three, four, or even more times in different directions in order to turn the earth over to a depth of 25 or 30 centimeters.

The Spanish Government, in creating a State monopoly of the sale of tobacco, extended the cultivation of this article throughout this province at the expense of all other agricultural products, the cultivation of which was greatly restricted; at the same time subjecting all agricultural labor connected with the production of tobacco to a strict accounting, without regard to private property or the climatological conditions of each locality.[b]

Such action was a useful lesson in agriculture to the inhabitants of Cagayan, because it proved that in sections within the influence of the seas, although tobacco grows and develops, it is of bad quality and of a disagreeable flavor. For this reason the districts on the seacoast as far as Lallo were not forced to engage in the cultivation of this article, which was confined, as it still is, to the interior districts—such as the Gattaran, Nassiping, Alcala, Baggao,

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[a] This report was prepared by Gov. G. Gonzaga, supervisor of the census, province of Cagayan, Luzon.

[b] This monopoly was established by royal decree, 1781, and was terminated December 31, 1882.—*Director.*

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Amulung, Iguig, Peña-Blanca, Tuguegarao, Enrile, Solana, Cordoba, Santa Niño, Piat, Tuao, Manauanan, and Malaueg—situated on both sides of the Rio Grande de Cagayan, of the Rio Chico de Itaves, and the estuaries of the same. These municipalities, being at some distance from the sea, produced a tobacco of good quality and pleasant to the taste, although the quality varies according to the soil properties peculiar to each site and locality. The other municipalities, such as Lallo, Camalaniugan, Aparri, Buguey, Abulug, Pamplona, Sanchez Mira, and Claveria, by reason of the influence of the sea, which borders or is near them, yield a tobacco of a very poor quality.

Furthermore, in the municipalities and sections which produce tobacco there is a notable difference between the high and low land product, both in the strength and development of the plants and in the quality of the leaves. An explanation of this may be found in the fact that high land is considered such land as is separated from the rivers and estuaries and is not covered by the waters of the overflow, and low land such fields adjoining the rivers and estuaries as are frequently inundated. Thus, the high lands do not receive the fertilizers which the waters deposit in the low fields or lands, so that the nutritive components which the former contained are gradually consumed, until in time they become exhausted and the land unproductive.

Nevertheless, there is an advantage in the high lands, originally wooded and volcanic, over the low lands during the period of their full productive vigor and force, as a crop is always assured the grower, and there is no fear of an abnormal overflow of the rivers before the crop is harvested. This sometimes occurs in the low lands, destroying plantations, houses, and tobacco storehouses, or covering the plants with water for a period of three, four, or five days, leaving the leaves rotten and worthless.

There are, therefore, different kinds of lands used in the cultivation of tobacco, such as high, argillaceous, and calcareous lands; high lands, originally wood lands, which are volcanic and sandy; fairly high lands, near rivers and estuaries, and low lands. The last named, with the exceptions noted, are the most suitable lands for tobacco, producing the best plants, with exuberant foliage, of good quality, color, and agreeable flavor; next in quality come the fairly high lands, then the cleared wood lands; and then, in the last place, the high, loamy, or calcareous lands. The last two classes of land require artificial fertilization in order to be profitable, while the low lands receive fertilization naturally from the sediment which the waters deposit during inundation.

The Cagayanes have never used fertilizer of any kind in their fields. On several occasions attempts have been made on the San Antonio, Santa Isabel, and Maluno plantations to use artificial fertilizers, but they were unsuccessful on account of the opposition of the Filipino laborers. Up to the present time the ordinary Filipino does not understand the necessity or advantage of using fertilizers.

The growers on high lands usually fertilize them with carabao or cow manure, which is mixed with the earth in plowing, or, when they have no manure on account of a lack of animals, as is the case at the present time, they use cornstalks, which they permit to rot.

SEED BEDS.

Seed beds are the places in which tobacco seed is sown, and from which the shoots are transplanted to land properly prepared, where the plants develop fully. These seed beds must be on high land, protected from the overflow of the rivers and close to the house of the farmer, in order that the great care which the tender plants require may be given them. Usually a place is selected for the seed bed which is not shaded by trees or houses in order that the seeds may receive the benefit of the winds and of the sun, which they require for their germination, and to prevent the new plants from being weak and delicate. These seed beds are usually made on level land from 40 to 50 feet square, or sufficiently large for double the number of plants which are required. It is surrounded by a small ditch containing water for sprinkling, the earth from which is placed in the middle of the inclosed section for the purpose of elevating it so that the water may drain off. The farmer works this section of land carefully until the soil is pulverized, and sometimes fertilizes it with rather dry manure. It is divided into beds 3 or 4 feet wide, separated from each other by small longitudinal ditches of little depth, in order to avoid the retention of the rain or sprinkled water, which might rot the seed or injure the delicate roots of the tender plants. After the land for the seed beds has been

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prepared the seed is scattered in the beds when the land is somewhat moist, either from previous rains or a moderate sprinkling.

Tobacco seeds are taken from the flowers of the strongest and most vigorous plants, which are reserved without topping and left to flower and go to seed. The pods are cut when ripe and placed in the sun to dry in order that the seeds may be easily removed from them. The seeds are kept in earthen vessels in order to protect them against such humidity as would be injurious until the time comes to prepare the seed bed.

Before scattering the seed it is mixed with fine dry sand or ashes in order that it may be properly distributed and separated, and is lightly pressed into the ground with the foot.

Different kinds of tobacco leaves are known, which are the product of several kinds of seed. The common varieties known in this province are Catabacuan, Espada, American or Habana, also known as Isabela, Decorazon, and Vizcaya. The first named, which produces leaves barely 35 to 38 centimeters long, but of an agreeable aroma, has been abandoned, because the plant hardly reaches the height of a meter, giving in proportion to its height a small number of leaves, requiring, in addition, great care, because it is the variety most subject to the ravages of worms. At the present time the only varieties cultivated are Habana or Isabela and Vizcaya, which grow to a height of 1½ or 2 meters, while the leaves are 1 meter or more in length and 50 centimeters or more in width. They produce leaves in proportion to their height and yield more leaves than other varieties without suffering in aroma or flavor, although they are different from the Catabacuan variety.

The season for the preparation of seed beds is governed by the character of the soil to which the shoots are to be transplanted. For high land, with regard to which there is no possibility of inundation, the seed beds are prepared in July and August and the transplanting takes place in September and October, while with low land the seed is sown in October or November and transplanting occurs in December or January.

Careful growers prepare the seed beds from which transplanting is to take place in highlands in soil of the same character, an effort being made to have the soil of the seed bed and that to which the transplanting is to take place identical in quality, in order that the roots may not suffer from a different soil on being transplanted. But unskilled or careless growers do not observe this detail, which is essential to the acclimatization and development of the plants.

After the seeds have been sown, the grower protects them against excessive heat and rain by means of shelters or covers made of bamboo or palm or banana leaves, with which the seed beds are covered from 10 o'clock in the morning until 4 or 5 in the afternoon on very sunny days, or when the rains are heavy and abundant. When the weeds have sprouted, the family of the grower begins to remove them, and also the worms from the tobacco plants. This must be done daily, morning and evening, until the time of transplanting.

During the period of the tobacco monopoly these shelters were prepared, because the employees of the government forced the natives to do so. When they were free, in so far as the cultivation of tobacco was concerned, they immediately abandoned the shelter of the tobacco in the seed beds, and at the present time properly cared for seed beds are seen only on plantations managed by Europeans.

Nor does the native take the trouble to irrigate the seed beds; he simply sows the seed and leaves the rest to Providence.

On very hot and dry days the seed beds should be carefully sprinkled, in order that they may not bake, and if, after they have sprouted, it is noticed that the plants are rather thick or close together, they must be thinned in order to permit the remainder to have sufficient room for development.

Tobacco seed beds should be plowed four times, but the Cagayanes seldom do so more than twice; it would be too much work for them.

A grower who leaves the care of the seed bed to his family is not free from work himself, because after the seed bed has been prepared he begins the preparation of the field to which the plants are to be transplanted, and is obliged to plow the ground two or three times a week for a month until the surface soil is well mixed and almost pulverized.

After forty-five days, or, at the furthest, sixty, when the plants have attained a height of 25 or 30 centimeters, the plants are ready to be transplanted from the seed beds. The plants are pulled with care, not much before or after the period mentioned, because if done before, the roots are weak and have not suffi-

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cient strength to develop in foreign soil; and if it be done much later the vertical roots would be injured when the plants are pulled.

The method observed for pulling the plants to be transplanted is to moisten the soil, if the weather be dry, in order that the roots free themselves easily. The most flourishing plants are selected, and with a small stick in the right hand, which is inserted beside the plant to be pulled, it is pressed in the direction of the root, and with a slight effort with the hand, in order that the end of the stick may rise toward the surface, the plant, which is held in the left hand, comes out without resistance, together with its vertical root and horizontal rootlets, without the slightest injury. This work is done during the coolest hours of the day—a's, for example, between 4 and 9 o'clock in the morning and 4 and 7 at night—and on moonlight nights it usually takes place between 5 and 10. When a sufficient number of plants for the transplanting in one day has been pulled during the hours mentioned, the plants are well arranged in a basket and covered with banana leaves and taken to the ground which has been prepared for the transplanting.

TRANSPLANTING AND CULTIVATION.

Before transplanting the grower plows longitudinal furrows on the ground, making them deep in high and chalky lands and not so deep in loose soil, with a distance of a meter, more or less, between furrows. Behind the plow usually follows a member of the family, who carries the basket of plants and drops the plants in the furrows one by one, at intervals of 1 meter or 1 vara. He is followed by another member of the family with a sharp stick, with which he makes holes in which he places the plants, leaving all the leaves above the ground, and taking care that the roots and the stalks enter the holes without bending, in order to keep the plants from dying or having a sickly growth. If the ground is quite dry, it is customary to water the plant, taking care not to let the water fall on the leaves, thus breaking them by the weight of the water.

After the tobacco has been transplanted, dead plants are replaced in order that the rows may have the same number of plants and no space be left unoccupied.

Three weeks after the planting it may be ascertained from the vigor and strength of the plants whether they have perfectly taken root in the soil. In such case the farmer passes with the plow in the space between the rows of plants in order to cast up the soil on the portion of the stalk uncovered by the earth.

When it is observed that the leaves which form the top of the plant are beginning to grow, which will be about two and a half months after the plant has taken root in the new soil, it is topped by cutting the buttons in order to prevent it from developing vertically, and at the same time the lowest leaves near the ground are removed in order that the nutritious juice shall concentrate in the remaining leaves, and the soil is again gathered around the stalk of the plant. This work leads to the sprouting of suckers, to which a careful grower gives much attention, removing them when the leaves of the plant have been removed, leaving only two or three of the strongest and most vigorous, which will give good leaves like the plant. With this care the leaves of the mother plant, as well as of the suckers, are gummy and of excellent quality.

Notwithstanding what has been said regarding topping, it must be remembered that the grower does not do this to all the plants, because were he to do so he would be left without seed. When the topping is done some plants are left to grow and blossom, from which the seed is taken, as has been mentioned.

After this comes the hardest work for the family of the farmer—this the removing of the worms which attack the leaves and destroy the plants. This is carried on through the entire field from plant to plant and from leaf to leaf every day from daylight until about 8 or 9 o'clock in the morning, and after sunset in the evening until about 8 o'clock, or even later on moonlight nights. This terrible tobacco plague, by a fatal instinct, selects the best plants and attacks the most healthy and juiciest or gummiest leaves, and sometimes, notwithstanding the zeal and activity of its exterminators, makes great ravages at night when it is impossible to combat them. Some of the more careful growers sacrifice their hours of rest and work at night by the light of torches; but such growers are very few in number, and rich planters usually have this done by their servants and laborers.

Three varieties of these insects are known—the green, which eat the top or crown of the plant; the yellow, which attack the leaves; and the black ones,

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which perforate the trunk, causing the strongest plant to fall to the ground. As yet the origin of these insects or a remedy to prevent their ravages has not been discovered.

A small, white moth, flying around at night, deposits its eggs on the tobacco leaves. These bear the worms which feed on the green tobacco. It would be easier to kill the moths at night with the aid of lights, but this is too much trouble for the Cagayanes.

CUTTING AND CURING THE LEAVES.

When the tobacco leaves are ripe, which is known by their yellowish color, they are ready for cutting. The upper leaves ripen first. The method employed for cutting or pruning the leaves of the plant is to take the leaf by the stem with the three principal fingers of the right hand, and with a small downward effort, supporting the plant with the left hand, to detach it without injury. This is done between 8 and 12 o'clock in the morning and 3 and 5 or 6 in the afternoon. It is not advisable to do the cutting earlier or before the dew which has settled on the leaves during the night has evaporated, as this would cause dark-green spots to appear on the leaves and injure their quality.

When the cutting takes place the grower, together with his family, goes into the field with a carabao cart, in which the cut leaves are placed in regular order in a vertical position with the stems downward, so that the points may not be injured. When the cart has been filled the leaves are covered with palm or banana leaves and taken in this condition to the drying shed or to the house of the grower, where they are placed in piles, care being taken that the leaves receive no blow or injury which would leave a spot and deteriorate their quality. The family of the planter places them on sticks or inserts them by the stem in split bamboo about half an inch thick and two or more meters long, which come to a point. A space of a centimeter is left between the leaves, so that when they are placed in the curing shed they may all have equal ventilation, as the leaves which do not receive this would mildew, thus injuring their quality and giving the tobacco a disagreeable flavor. When the leaves have been placed on the sticks they are hung from the roof of the shed with ample space between the rows. No space at all is left between the leaves, but on the contrary as many leaves as possible are squeezed on one stick.

As a general rule curing sheds are not used. About 10 per cent of the growers of tobacco have curing sheds, the others drying their tobacco in the sun until it loses its green color, after which it is hung in the house until sufficiently dry. But there are many who do not wait for it to dry completely, the consequence of which is that it rots and the leaf loses its consistency. Bad and irregular coloring prevails at the present time in Philippine tobacco, due to a great extent to the drying in the sun.

As is known in all tobacco-producing countries, the drying and curing must take place in a dark, shady place, in order that the color may be uniform.

The drying shed has a nipa or cogon roof supported by wooden posts, well raised above the ground, and usually without floor or walls, although some have movable walls of woven bamboo, which may be opened or closed under certain conditions. The dimensions of the drying sheds vary according to the amount of tobacco and the activity and resources of the farmer.

During the time of the tobacco monopoly under Spanish domination the tobacco grower was obliged to build a drying shed at his own expense, in addition to those which the Government built in certain populous barrios. But since the cessation of the monopoly, by which the cultivation of tobacco has become entirely optional with the planter, curing or drying sheds have been disappearing to such an extent that at the present time there are but very few farmers who build drying sheds, supplying the lack thereof with the lower floor of their houses and their porches, and when these are not sufficient they use the upper floors of their dwellings and their kitchens.

The advantages of special drying sheds are the orderly arrangement of the leaves, good ventilation, and the protection afforded during the season of heavy rains.

Sheds without walls, during rainy periods, give the family of the grower work in wiping the leaves with a cloth in order to remove the moisture they may have received. But if the tobacco is cured in the house, the leaves suspended beneath the floor receive all the dust which sifts through; those on the upper floor, on account of the constant movement of the people dwelling therein, frequently receive violent blows which produce spots and defects; while those

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hung beneath the eaves are exposed to the sun and rain, which destroy their special quality. It is advisable, according to some planters, that the tobacco leaves be exposed to the sun two or three days before being hung up for curing because they thus get a better color later when they dry, but expert growers are of opinion that this is injurious because it gives them a disagreeable flavor.

The time required for curing the tobacco leaves varies according to their size, the season, and place. Small leaves in drying sheds and those hung under a roof take from fifteen to twenty days, and the large leaves from twenty-five to thirty days; those exposed to the sun dry in a relative shorter time. But during rainy weather the process takes longer, because the humidity prevents the leaves from drying well, and if they are not completely dry, fermentation progresses too rapidly, exposing them to burning, when they become a total loss to the planter.

When the leaves are quite dry the sticks are carefully taken down and placed in piles from 6 to 8 meters square, and of 2 or more meters in height, according to the quantity of tobacco, which also regulates the number of piles. The latter are covered with mats 1.25 meters long and 1 meter wide, which are placed on the sides and tops. These mats are made of *basta*, the bark of the banana trunk, divided into strips of 8 centimeters in width, which are dried in the sun, made into mats, and used for the wrapping of tobacco.

Every four days the piles are turned—that is, the sticks are turned so that fermentation may be equal in all the leaves.

As it is impossible to judge of the quality of the leaves when they are strung for drying by reason of their freshness and greenness, the persons who do this look only at the size, stringing on the same stick the leaves of one size. After the second turning over the leaves are removed from the stick and are sorted, when they are placed on sticks of a shorter length—1 meter or less long—and are again placed in piles in the manner mentioned, but are turned over every six or eight days until this has been done three or four times.

While the leaves are being piled and turned over they acquire their color gradually, but before they have the desired color the leaves are again taken from the sticks and tied in bundles of ten by their stems, every ten bundles forming a pack, commonly called a "hand." This is a simple but delicate operation, because in forming the bundles, which are tied with thin strips of basta, without separating the ten sets of ten leaves which the stick contains, they are gently smoothed in order to cause the creases to disappear, the stick is withdrawn, and the hundred leaves are carefully rolled, care being taken to keep the borders of the leaves inside. Then the roll is tied with strips of basta at three points, one in the middle and one at either end of the hand.

These hands or packs are again piled, and in order to cause them to ferment large piles are made, with the stems of the leaves on the outside, so as to prevent the points of the leaves from being injured. If the piles are square they are left with openings at regular intervals, which are called "troneras," and serve as ventilators to prevent a too rapid fermentation, which would burn the tobacco; if the piles be round or circular, a hole is left in the center.

The number of times these piles, which are known by tobacco planters as "mandalas," should be turned over is regulated by the quality of the tobacco leaves; if the leaves are thick or juicy and gummy and the weather is quite dry the pile is turned after six or eight days, and if it be damp or rainy weather, after ten or eleven days. Fine leaves require two days more, and are turned over two or three times more until the leaves acquire a more or less dark chestnut color.

Tobacco planters and those engaged in the tobacco trade in this province who are familiar with the work of curing the tobacco do not need to know the age of the piles in order to know when they should be turned, because the odor of the tobacco indicates the proper time. When fermentation begins more heat than usual is noticed in the spaces between the leaves when the hand is inserted therein, the degree of heat increasing daily; after four or five days the tobacco gives out an agreeable odor, which becomes accentuated day by day until it becomes almost repugnant. Then turning should take place and not a single day should be permitted to elapse, because of the danger of burning the bundles in the lower part of the pile. After the hands of tobacco have been turned three or four times in the pile they are ready for the market.

We have spoken of the suckers which grow from the plant after it has been topped. In order that these suckers may yield large leaves of good quality, after the leaves have been removed from the stalk the grower cuts or removes all the suckers but two of the strongest and healthiest ones, selected before-

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hand, one near the bottom and another about a third of a yard higher; then the stalk is cut at the joint where the sucker grows, in order that the fertilizing juices may properly nourish the leaves and hasten the ripening.

EXPENSES AND PROFITS.

The opinion is general that tobacco is the most profitable crop to the planter in the Philippines. This opinion is confirmed by the high price which this product has brought some years in the Manila market. The high prices which have obtained for two consecutive years, 1900 and 1901, and which will not return in view of the state of the foreign markets, can not serve as a basis for a calculation of the profits. Such a calculation, to be approximate, should be based on the ordinary prices which tobacco brings in the locality where the growers sell their products. The expenses they incur must also be considered, because without this data it would be impossible to judge of the profits.

In order to ascertain these facts—that is, expenses and profits—it is necessary to look into the manner in which the grower or planter of tobacco places his product on the market.

It has already been said that the last work connected with the tobacco leaves is to make bundles of every 100 leaves tied together. Every 40 bundles form a bale, in which form the tobacco is offered for sale.

The price of the tobacco bales is fixed according to the class of the article, or is agreed upon between the purchaser and vender. Formerly, after the cessation of the monopoly, it was lower, but has increased notably and is being maintained at the present time.

Tobacco is divided into five classes, from the first to the fifth, depending on the length of the leaf, absence of spots, and defects, such as breaks or holes made by worms.

The leaves of the first class should be 45 centimeters in length from the stem to the point. Those of the second are 39 centimeters in length, clean and sound, as those of the first. Those of the third class are leaves without spots and defects, 26 centimeters in length. Of the fourth class, the leaves contain some spots, breaks, or perforations made by worms, and are 24 centimeters long, while the fifth class consists of leaves of the same character 22 centimeters long. It should be noted that bundles of leaves having the length of the first class or a greater length, but with six or more leaves having black or greenish spots, or breaks or perforations, are put in the next lower class; if the number of defective leaves exceeds 12, the bundle goes to the third class, and if the number of the defective leaves reaches 20, it descends to the fourth class.

This was the classification under the Spanish monopoly, but at the present time no one pays any attention to it, and the tobacco is classified as the grower may wish. This is due, to a great extent, to the competition in the market. According to a former agreement, fixed prices have been set for each class of tobacco, and these have not apparently changed, but in reality they are changing continually, because if there are few purchasers the tobacco is classified as it should be; but as soon as the demand increases the purchasers do not observe the classification so strictly, and tobacco of the second class is classified as of the first, that of the third class as of the second, and so on. By this means the grower receives a higher price than the customary one.

With the data mentioned, the expenses and profits may be shown, taking as a basis 1 hectare of land.

One hectare of low land is valued at $200 at the lowest, and of high land at $100.[a]

In order to properly prepare the land for the seed beds it should be plowed several times. This necessitates the labor of 1 person with a carabao for two days, at $1 per day.

The preparation of a hectare of land, by plowing several times in different directions, requires the labor of 1 man with a carabao for twelve days, which, at 1 peso per day for the man with his carabao, would amount to $12 Mexican.

For sowing or transplanting seeds in 1 hectare of land, 3 men and 1 carabao are necessary for five days, which, at 50 cents per day per man and carabao, amounts to $10 Mexican.

As has been already stated, the tobacco plants require great care on the part of the grower, if he wishes to see his hopes realized. This care must be con-

[a] All money values are expressed in Mexican dollars (or pesos), the local currency in the Philippines.—*Director.*

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tinuous and varied during development, beginning with the removal of foreign growths, which might deprive them of some of the fertilizing juices, then the hilling of the plants, afterwards the extermination of the worms, the last work being the most laborious one, but of the greatest importance to the grower. Supposing that 4 men are employed on this work five hours per day for a period of forty days, each one earning 31¼ cents per day, the amount would be $50 Mexican. This would not include the work of topping the plants, the removal of the suckers which grow after the topping and of the leaves which are on the stalk and touch the ground.

For the gathering of the leaves 4 men are necessary, with 1 carabao and wagon or cart. They are engaged for three days each during three seasons at the rate of 50 cents per day per man and 50 cents for the carabao, the total amounting to $22.50 Mexican.

As the leaves are cut from the plants they are placed in the cart, covered with palm or banana leaves, and transferred to the house, where they are received by 4 women, who sort them according to size. After they have been sorted they are placed on sticks or on split bamboo 1 centimeter in thickness with a pointed end, and after a sufficient number of leaves have been placed thereon, with the spaces between them which are necessary for ventilation, the stick is hung in the place set aside for the curing. This work takes as long as the gathering, and estimating the daily wage of each workwoman at half a peso Mexican, the sum total of the wages for the four women during the nine days would be $18 Mexican.

When the sticks are taken down from the drying shed they are placed in piles. For the piling of the leaves of 1 hectare of land it is necessary to employ 4 persons for three days each, whose wages, at 50 cents per day, would amount to $6 Mexican. We do not consider the work of turning the piles, which is done once, twice, or oftener, according to the care and diligence of the grower.

After the turning comes the laborious and delicate task of selecting and separating the leaves into classes. This operation is one for women exclusively, and supposing that in one day 25 women are engaged, and that in addition to the classification of the leaves they tie them by tens by the stem and string each ten bundles on another shorter stick, the wages would be 50 cents each, or $12.50 Mexican.

In order that the tobacco may be in proper condition for the market another operation is necessary. This consists in dampening the leaves to give them some elasticity, so they will not break when smoothed and ironed. The hundred leaves contained on each stick are removed and fastened in three parts, in order that they may not become untied in turning. If it be supposed that 25 women are sufficient on this work for one day, at 50 cents each per day, which is a low estimate, the amount would be $12.50 Mexican.

The hands are again piled and the piles turned over two, three, or four times in order to avoid a rapid fermentation, which would result in burning the tobacco. Supposing that four turns are given to the piles, which is the usual number necessary, and each turning be done by 2 men in two days, the wages would be $8 Mexican.

These expenses are incurred by a tobacco grower in cultivating 1 hectare of land, and do not include the interest on the estimated value of the land.

In order to ascertain the profit to the tobacco grower the following high estimates are made: It is first considered that 10,000 plants have been transplanted to 1 hectare of land; second, that 20 leaves have been gathered from each plant—that is to say, 12 from the plant and 8 from the two suckers which ought to be left—giving a total of 200,000 leaves gathered from the 10,000 plants, which, reduced to bales containing 40 hands, and the hand 100 leaves, would make 50 bales of the 200,000 leaves from the 10,000 tobacco plants.

The price of a bale of tobacco, according to class, is determined and fixed by custom, which is changed with difficulty; so that in the deal for the sale of this article the purchaser and vender do not speak of the price, because it is taken for granted that it is the market price, and consequently the agreement is confined to the classification and amount.

An explanation having been made of the classification of tobacco leaves, their prices per bale are: For first class, $14.25; second, $9; third, $4.12½; fourth superior, $2; fourth current, $1.50; and fifth, $0.50.

Supposing that 200,000 leaves gathered would yield 50 bales of 40 hands, and supposing that of these 50 bales one is of the first class, three of the second, six of the third, twenty of the fourth superior, twelve of the fourth current, and eight of the fifth class, and that the leaves of the fifth class are raised to the

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fourth current in order to increase the value of the crop, nevertheless, if it is desired to ascertain the exact and true value at 50 cents per bale of the 20 bales of the fourth class above mentioned, an exact proportion must be secured.

Expenses and income are summed up in the following table:

Expenses and income to the grower of tobacco for 1 hectare of land.

EXPENSES.

Wages of 1 man and 1 carabao for 2 days, for the preparation of the seed bed, at 50 cents per day for the man and the same amount for the carabao	$2.00
Wages of 1 man and 1 carabao for 12 days' labor in preparing 1 hectare of land, at the rate of 50 cents per day for the man as well as the carabao	12.00
Wages of 3 men and 1 carabao for 5 days, for sowing or transplanting, at 50 cents each per day	10.00
Wages of 4 men, for the cleaning and care of the plants, at the rate of 31¼ cents for 5 hours' work per day	50.00
Wages of 4 men and 1 carabao with a wagon for 9 days for the gathering of the leaves, at 50 cents per day each, as also the carabao	22.00
Wages of 4 women, at 50 cents per day, for the sorting, placing on sticks, and in the drying shed of the tobacco leaves, for 9 days	18.00
Wages of 4 women, at 50 cents per day, for 3 days, in piling the sticks of tobacco after curing	6.00
Wages of 25 women, at 50 cents per day, for classifying and making of bundles, for 1 day	12.50
Wages of the same, at 50 cents per day, for ironing and formation into bundles, for 1 day	12.50
Wages of 2 men, at 50 cents per day, for turning the piles four times, at the rate of 2 days for each time	8.00
Total	153.00

INCOME.

Proceeds from tobacco leaves from 1 hectare of land:	
Of the first class, 1 bale	$14.25
Of the second class, 3 bales	27.00
Of the third class, 6 bales	24.00
Of the fourth superior class, 20 bales	40.00
Of the fourth current class, 12 bales	18.00
Of the fifth class, 8 bales	4.00
Raising to the fourth class current the 8 bales of the fifth class, the increase is	8.00
Balance in favor of the expenses	17.75
Total	153.00

The calculation regarding the cost of the amount of tobacco cultivated in a hectare of land is entirely misleading, because in no place in the province of Cagayan is there a planter who works his lands with paid labor; furthermore, it would be absolutely impossible to cultivate tobacco in this manner and obtain positive results—that is to say, as long as the necessity exists of employing native laborers. The reason for this is that the native does not work for less than 75 centavos, or 1 peso, per day, and as he is so lazy, he works only two or three hours in the morning and a similar period in the afternoon.

The grower usually prepares his seed beds without assistance, and when the time for plowing comes he calls upon five or six of his neighbors, all of whom come with their plows and carabaos, and in a few hours in the mornings and afternoons, for a few days, prepare the beds for the reception of the small plants. For the purpose of effecting the transplanting they call upon the women and children of neighboring families, and this work is also done in a few days. They thus assist each other, but without spending a cent. Upon the conclusion of the transplanting the man does nothing more, leaving the care of the field to his wife and children. The cutting of the ripe leaves is also left to them. At the cutting period all the man does is to transport the cut tobacco

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to his house by wagon, where all the other work of piling, curing, etc., is done by the women.

The grower pays nothing for help, and the money that he receives from the sale of his tobacco is considered by him as clear profit, as indeed it is.

It is very rarely the case that a hectare produces 50 bales. This result may be obtained only by using the shoots, but as their leaves are very small they have hardly any value and are never classed above the fifth class. In well-cultivated lands where the plants receive the proper care a plant does not yield more than 15 leaves, and one hectare would thus yield 37 bales and 20 hands.

In the crop of 1903 the proportion of the different classes of tobacco produced in the province of Cagayan was as follows:

First class, 1.2 per cent, or in a crop of 50 bales, 0 bale 24 hands.
Second, 3.1 per cent, or in a crop of 50 bales, 1 bale 22 hands.
Third, 6.5 per cent, or in a crop of 50 bales, 3 bales 10 hands.
Fourth superior, 11.7 per cent, or in a crop of 50 bales, 5 bales 34 hands.
Fourth ordinary, 31.1 per cent, or in a crop of 50 bales, 15 bales 22 hands.
Fifth, 46.4 per cent, or in a crop of 50 bales, 23 bales 8 hands.

If the tobacco is cultivated as it should be, it is an easy matter to secure in 50 bales—3 bales of the first class, 5 of the second, 8 of the third, 10 of the fourth superior, 19 of the fourth current, and 5 of the fifth. During the last year of the monopoly, 1882, the Spanish Government sold the first class in Manila at $112 per quintal, when exchange on London was at 4.01; now a quintal of the first class brings hardly $30 Mexican. All this is due to the great carelessness of the grower.

In the above estimate it has been indicated that the number of leaves of tobacco for 1 hectare of land is 200,000, equivalent to 20 per plant; but this is rarely the case, because the plants do not all attain the same height, nor do they all have the same number of leaves, and even if this were so it would be impossible to avoid some being injured and rendered useless. A more correct estimate would be 15 leaves per plant, in which case the result would be 36½ bales.

The estimate is also high regarding the classification, because ordinarily in a crop of 50 bales there is not found one of the first class nor three of the second, although the proportion of the other grades is frequently found in a number of bales of this size.

After the growers have sold their tobacco, the buyers, in order to increase their profits, are obliged to incur other expenses for the purpose of improving the quality of the tobacco, or at least to preserve the quality it had when bought, as also the expense of packing it for transportation.

This work consists in making piles which are covered with mats, so that the tobacco may ferment and get a better color. The piles are turned two or three times, according to the condition of the leaves, in order to dry them sufficiently before packing to prevent fermentation after packing.

When the tobacco is ready for packing, the merchant or trader again sorts and grades it to suit himself, but always endeavoring to improve the class, because if he retains the grades as he bought them, a loss would be inevitable.

After classification, the tobacco is again piled according to classes, and the packing is proceeded with, every 3 quintals or 2½ hands of tobacco being wrapped in two mats and pressed into a bale of a quadrilateral shape 1 meter and 10 centimeters long, by 70 or 80 centimeters high, and tied with split bamboo from end to end and crosswise.

After the packing is completed, the bales are either stored or hauled to boats for transportation to the port of Aparri, where they are loaded on ships for Manila.

In brief, all the expenses of the trade, including the improvement and packing of the tobacco purchased, the transportation of the bales from the warehouse to the river and to Aparri, the unloading at that point, and storage if there should be no vessel in port for Manila, transportation to the vessel, freight from Aparri to Manila, cost of marine insurance, unloading and storage in Manila, fire insurance, and sale commission, if the tobacco is not sold on board, are estimated at $7 per bale of 2½ or 3 quintals.

The weight of the tobacco depends on its quality, so that tobacco of the first class has more weight than that of the second, and so on.

Thus, a bale of 40 hands of tobacco of the first class varies between 50 and 60 pounds; of the second class, between 40 and 50 pounds; of the third class, between 35 and 40 pounds; of the fourth superior class, almost the same as the third class, because the defective leaves of the superior grade are included

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in it; of the fourth current class, between 30 and 35 pounds; and of the fifth class, between 20 and 30 pounds.

The weight varies according to the quality of the crop and according to the classification and competition. The weight of the crop of 1903 gave the following results: One bale of the first class, 50 pounds; second class, 45 pounds; third class, 34½ pounds; fourth superior, 34 pounds; fourth current, 20 pounds; and fifth, 11 pounds.

When 50 bales of the best qualities of tobacco (from first to third grade, inclusive) represent a third part, more or less, of a crop, it can be estimated at 5 bales per quintal of one class or another (from first to fifth grade), and, therefore, from the 50 bales 10 quintals are secured, which, sold at $20 per quintal, amounts to $200; but the price of tobacco in the Manila market fluctuates according to the demand. At the present time it barely brings $15 per quintal.

Due to the depreciated value of tobacco in the Manila market, there is a scarcity in the province of dealers in the article, and although there still remain here the agents and buyers for the mercantile houses, who engage in the purchase of tobacco from the growers, the absence of other buyers injures the interests of the growers to a notable extent, not on account of the reduction in price of the article (which, being fixed and standard, can not be changed), but due to the low classification of the tobacco, on account of lack of competition, which is more prejudicial than the reduction in price, by reason of the great difference in the value of one grade as compared to another.

The growers or planters of tobacco are convinced that the cultivation of tobacco brings them more profit than any other agricultural product, because they take no account of the money invested in the land or its exhaustion from continued planting, or the work of the carabao, or that of the members of their families or the relatives, neighbors, and friends who assist them, because such work is repaid in kind. When their carabaos die, or when they have none, or when they have no money for their necessities, they apply to Chinese or Filipino traders for a loan of money at an interest of 50 per cent, payable in tobacco at harvest time. They do not consider the high interest, provided they satisfy their necessities, no matter how puerile they may be, because they expect to pay both the loan and interest with the proceeds of their next crop; but sometimes the crop is lost through accident, and at other times it is small, and the creditor does not wish to extend the time of payment, hence this expectation is not realized, and the tobacco grower is obliged to give up his lands in liquidation of his debts. From this it may be inferred that the tobacco farmers are not always intelligent in regard to their financial interests, because there are other products which are easily cultivated, such as abacá, cacao, coffee, maguey, cotton, cocoanuts, corn, wheat, and potatoes, and which, even if they do not yield very large profits, give at least something in remuneration for their work.

Hemp, cacao, maguey, and cocoanuts can not be cultivated in Cagayan on account of existing conditions. Coffee grows well. Corn also grows well, and constitutes practically the only food of the natives. Wheat and potatoes may be grown during the winter months, but they require here much more care than in cold climates, and the Cagayan is not fond of work.

It would be regrettable were the cultivation of tobacco, which figures among the valued products of the Philippines, such as sugar and coffee, to disappear from Cagayan, and before the day comes for its abandonment it is urgently necessary that efficient measures or remedies be adopted tending to alleviate the present painful situation.

Never as at the present time have so many misfortunes joined together, each of which threatens to exterminate the Philippine planters in general, and the grower of tobacco in Cagayan in particular. The rinderpest, which has been prevalent in the province for some years, has visited all the townships and exterminated the carabaos and other cattle. Horses were similarily attacked by surra, and between the two diseases the cattle of certain districts were gradually destroyed, and if any carabaos are found it is due to the fact that they have been purchased recently. Then came the drought, which cracked the earth and burned the plants; then the locust plague, which visited all the districts and plantations, cleaning out all vegetable growth; and finally, to supplement these misfortunes, came smallpox, dengue, and cholera.

A remedy suggested is the establishment of an agricultural bank, to lend money to the farmers on mortgages at a moderate interest of, say, 6 or 8 per cent per annum. This bank could engage in the tobacco industry, both as a means to assure payment of its credits as well as to improve the price of the article and destroy the monopoly of the commercial companies. For this purpose

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the bank should have agents and branches in the markets of Europe and America, for the exportation of tobacco and for the importation of rice and other articles needed by the inhabitants of the province.

In order to supply the lack of work animals and to provide against droughts the bank could engage in the work of irrigating the fields to be used in the cultivation of tobacco and cereals, of bringing in plows and portable irrigation pumps, and of working the fields for a small compensation in money or crops.

The only purpose of these brief suggestions is to indicate the remedy considered efficient to alleviate the infinite number of misfortunes which the farmers suffer, but no doubt is entertained that other and better methods could be found by persons more expert on the subject.

In conclusion, it may be said that the province of Cagayan, according to the last official guide of 1896, has an area of 1,438,000 hectares, without including the Batanes Islands. This vast area is inhabited by 133,839 Christians, according to the census, without counting the Batanes Islands or the non-Christian tribes of Igorots and Negritos, who live in small settlements on the mountain sides, their number being estimated at 13,414.

Owing to this small number of inhabitants agriculture has remained stationary. For the development of this source of wealth it is advisable to encourage the immigration of the inhabitants of Ilocos Norte and of other populous provinces where suitable land is scarce. In this manner the cultivation of various products would become more extended, and the civilized towns would increase and encroach upon the territory of the savage tribes until the latter are reduced to civilization.

The building of a road in the central range which separate Cagayan from Ilocos Norte will be a valuable factor toward the immigration of natives of that province who have no land to work nor woodland, and who would be very glad to come to Cagayan were it not for the expense of the journey via Laoag and the port of Aparri.

Another means which, if it will not promote immigration, will at least attract people, is the establishment of a railway traversing the province of Cagayan from south to north. With the influx of strangers agriculture would flourish, the markets of this province would become more active, industry and commerce would rise from their state of prostration, while the culture and experience which the natives of this province would derive from their contact with people of different provinces would no doubt create many new necessities, and would in that way stimulate the sources of wealth.

[Same Hearings Page 225.]

STATEMENT OF A. DETERMANN, MANILA, P. I.

Memorial regarding the Philippine tobacco industry and the Dingley tariff.

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Up to the abolishment, in 1882, of the Spanish Government's tobacco monopoly in the Philippine Islands, whereby the planting, harvesting, curing, etc., was carefully supervised by the Government officials, the Philippine tobacco has been held in high esteem in many parts of the world, and Manila cigars were generally much appreciated for their fine quality. While the exercise of this monopoly certainly caused unjust hardships on the natives, the good reputation of the Philippine tobacco was preserved during that time. Since then its quality has slowly but steadily decreased, partly because of the apathy shown by the native farmers, partly from lack of encouragement, and also in consequence of bad seasons, wars, etc.

The above refers to the product of the Cagayan and Isabela provinces, i. e., the territory known as the "Cagayan Valley," which is the only district coming into consideration for better-class tobacco. In fact, in all the other islands of the archipelago but in Luzon the monopoly was not in force, a proof that the other regions were known to produce only an undesirable leaf. The yearly production in Cagayan and Isabela may amount to about 200,000 to 300,000 quintals per annum, according to the results of the crops, one-half of which in

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good years, as consisting of good to middling quality, may have been suitable for cigars.

The other provinces of Luzon where tobacco is grown are Union, Abra, and the Ilocos, and a little in Pangasinan and Batangas; but the value of these grades does not surpass those grown in the southern islands (Panay, Cebu, Masbate, Negros, etc.) by reason of climatic conditions, those of the soil, etc., and their geographical situation. These inferior grades are almost entirely used for cigarettes smoked in the Philippine Islands. A very small part is exported. The trade does not pay well for common tobacco, wholly unfit for cigars, as grown in those districts. The product in all the above-mentioned provinces except Cagayan and Isabela may be from 200,000 to 300,000 quintals, so that the entire production of tobacco in the Philippine Islands does not exceed 500,000 to 600,000 quintals per annum (50,000,000 to 60,000,000 pounds, of which not more than, say, 10,000,000 to 15,000,000 pounds may, in the case of a good crop, be worked into cigars).

Statistics of exports of the raw products since 1891 (giving quantities only) will be found in Appendix 8. Statistics of exports of manufactured and unmanufactured tobacco (giving values only), since 1901 (figures for previous years not being available), will be found in Appendix 9. In this connection it may be observed that during the year ending June 30, 1901, the United States paid for Cuban tobacco about $9,700,000 gold, and for Sumatra tobacco about $5,600,000 gold. The whole export of tobacco, manufactured and unmanufactured, from the Philippine Islands amounted in the same year to about $2,200,000 gold, whereof the United States took about $5,000 gold worth, equal to about one-fourth of 1 per cent. Further particulars about the history of the Philippine tobacco and description of its cultivation may be found in Farmers' Bulletin No. 5, Cultivation of Tobacco, by Clarence W. Dorsey, published by the Manila bureau of agriculture. (See page 881.)

There are still a few plantations in the Isabela Province under intelligent supervision, where the cultivation to the extent of, in all, perhaps 20,000 to 25,000 quintals, equal to 2,000,000 to 2,500,000 pounds, is carried out in the proper manner, and consequently the leaf produced there represents generally a good quality, though the greater part is of a fat, gummy nature, not suitable for cigars. With this exception tobacco culture in the Philippine Islands is entirely in the hands of natives, i. e., individuals.

The soil of the tobacco lands in the Isabela Province is fairly heavy, limey, and rich in decayed vegetable matter, left on the land during the rainy season by the rivers, which overflow their banks, flooding the country often 2 or 3 miles from the original bed of the river. This province would certainly produce a finer leaf if the cultivation were practiced on a scientific plan and if the labor problem did not place an obstacle to such an undertaking. At the same time it is only doing justice to the native if we say that he has found little encouragement for his work during the last years and that he also met with enormous adversities of force majeurs character, which have been diminished the relative energy formerly shown in producing a good well-cured leaf.

The Spanish market has been practically lost since the American occupation of the Philippine Islands, for during the former régime the tobacco monopoly in Spain was obliged by the Government to buy a certain quantity of Philippine leaf, for the maintenance of which clause there is naturally now no particular reason. In former times Philippine tobacco was also exported to Holland and Belgium, but the demand there has to-day diminished to about nil. Then the Japanese and Australian markets were closed through protective tariffs established in those countries, and Hawaii ceased to buy Manila cigars since its incorporation to the United States and the consequent operation there of the Dingley tariff. The outlet for the Manila cigar was then limited to the domestic consumption and to the demand in China, India, and Europe, which is now very small indeed, owing to the competition of cheap German, Dutch, and Burma cigars.

If ever an industry has intensively suffered it is ours. The war and its consequences, the widespread rinderpest (destroying far more than 50 per cent of the draft animals (carabaos), whose value has since increased by 400 to 500 per cent), cholera, and locust invasions have dealt out such severe blows upon tobacco agriculture in the Philippine Islands that people in those districts were left in the greatest distress. But not enough, even nature failed to assist them in their misery; unfavorable seasons did their share during several consecutive years, and caused the product to be of poor quality and therefore of less value than before.

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All this happened during a time when the cost of living became daily more expensive, without those farmers gaining an equivalent in a rise of the price for their product; also as regards the inferior grades worked into cigarettes for home consumption, as the people were unable to pay more for their smoking supply than before. There is a report from Governor (of the Cagayan Province) Gonzaga with the Census Bureau, giving a very graphic description of the condition in that province, which also applies to the Isabela Province. It is shown there that the average native farmer derives no profit whatever from his yearly work and that of his whole family and his carabao, i. e., he fails to include this labor in his calculation, and so he imagines that he obtains a profit from his toil. If a native farmer produces annually 20 to 30 quintals (1 quintal=46 kilos, or about 100 pounds English) of tobacco on his piece of land and received to-day perhaps $7.50 gold per quintal on the average, he may consider himself very fortunate. In the other provinces the individual may raise a larger crop, because the ordinary leaf, totally unfit for cigars, requires less care, but this tobacco, on the average, does not fetch more than, say, $4 to $6 gold per quintal. Now, these $150 gold to $225 gold, which are to give him and his family their daily bread, to clothe them, to feed his carabao throughout the whole year, and to include an amortization on the value of his land, his carabao, his tools, the cost of seeds, payment of taxes, etc., are they not inadequate for this purpose?

In 1900 the average price for the Isabela leaf (filler) was $15 to $20 gold per quintal, which was considered as exceptionally high. If former prices did, on the average, perhaps, not exceed to-day's values, it must be remembered that in those times the same money was worth twice or three times as much as to-day in the island. There is no exaggeration in the assertion that the people are almost if not actually starving. They can not from one day to another turn to another branch of agriculture, as Senator Dietrich advised them to do. Such an undertaking requires money to start with, and they do not possess even the money for their most urgent wants. They are in desperate need of help, and this it is hoped may be attained by favorable legislation on the part of the United States Congress.

The cigar laborers have already repeatedly appealed to Congress for an improvement of their situation, and stated the details about the circumstances that brought about their misery. Unfortunately the state of affairs which has now become more and more acute has had as consequence several strikes since 1902 without the manufacturers having been able to accede to the demands for higher wages on part of the laborers, with the exception of an increase of about 10 per cent which was granted two years ago. By the recent change of the currency in the Philippine Islands their wages have again found an accidental increase of about 10 per cent. The constantly receding trade offered no possibility for the manufacturers to go any further in this respect, though they fully recognize the misery in which the laborers were placed through the enhanced cost of living. They can not to-day even employ half of the number of men and women who would gladly work for the present wages. And this is, excepting a few other industrial establishments, as a match and a hat factory, the only industry in the islands, having given an honorable existence to a great number of people, not only to the workmen, but also indirectly to the planters.

The number of work people, male and female, employed in this industry in the Philippine Islands may to-day amount to about from 12,000 to 15,000, while in former times there were almost double this number in the same capacity. Reckoning the whole number of people, workmen and planters, in Cagayan and Isabela only, with their families, all of whom are directly affected by this deplorable state of affairs, we may take 300,000 to 400,000 as an approximate estimate.

The balance sheets of the different companies engaged in this trade in Manila must have indicated very poor results during the last years, and as far as those concerns are considered whose shares are quoted in the open market the values of the latter demonstrate rather strikingly the above-stated condition of the industry. Quite a number of cigar factories have been closed during the last years, and some others are in such a poor state that they are not supposed to survive many months to come under the prevailing circumstances.

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First of all, from the geographical configuration of the Philippine Islands it is easily seen that there exists only a small area in the archipelago in a distance of more than 20 to 30 miles from the seacoast, and therefore not exposed to the

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damaging influence of the saline sea breezes. It is well known that any tobacco grown near the sea has poor combustibility, and is therefore wholly unfit for cigars. For this reason all of the Philippine Islands except Luzon and Mindanao can not grow exportable tobacco, i. e., tobacco of an acceptable quality. As far as Mindanao is concerned, this island possesses several large valleys with alluvial soils that could undoubtedly be made to produce a good quality of tobacco, but this island is still almost entirely unexplored. Besides, even supposing that one could find laborers to go there to deforest the land and cultivate tobacco (the present population, the Moros, is certainly too indolent for such an undertaking), there would have to elapse a period of twenty to thirty years before we would see any Mindanao tobacco. As for Luzon, there are still some small regions which could perhaps be used to advantage for tobacco culture, in so far as the distance from the sea is concerned, but the larger portion of this country is mountainous, while lowlands, preferably with the periodic overflow, are needed to produce a desirable leaf.

And it is not only this; the soil must be specially apt for this agriculture and the rainfall not exceed a certain limit, etc. While, as we said, the Cagayan Valley, or more particularly the Isabela Province, combines all the favorable conditions for the production of tobacco of good quality, there is no district in all Luzon which could be compared with the former in the said respect. In Isabela the cultivation of tobacco may be still extended, but to a very small degree, as nearly all desirable land is already under cultivation. (Compare reports of the Civil Commission for confirmation of this statement.)

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The crops of the last four years in the Cagayan and Isabela provinces have been notoriously deficient in quality, and the little that was available for producing good and middle-class cigars has now been partly used up and is partly still in the hands of some manufacturers in Manila, so that, for instance, to-day there are very likely not more than 20,000 to 30,000 quintals in Manila and still in provinces which may be worked into good cigars. The greater part of the tobacco of the last crops has been dark and of thick leaf, and could only be used for cigarettes and also for cigars for consumption in the Philippine Islands, where the public are not so delicate in the choice of their smoking supply, as long as the prices thereof are within the reach of their pockets.

Then there is the great labor question, the much-discussed point in commercial and agricultural life in the Philippine Islands, and the obstacle to any great enterprises looked for in vain during the past years. The importation of Chinese laborers, skilled or unskilled, is prohibited by law, the same as in the United States, so there is no possibility of securing cooly labor from outside. We depend entirely, exclusively, on Filipino labor. About the latter much has been said and written and, as alluded to above, there seems to exist some divergency of opinions regarding the true value of this labor.

Experience in the Philippine Islands has proven that there has always existed the greatest difficulty in securing efficient labor for all kinds of commercial and industrial establishments, which otherwise would to-day exist and flourish.

The average Filipino likes to stay at his home, on his own piece of land, in his native village and province, and is most averse to changes. He will not plant tobacco in Cagayan and to-morrow rice in Pangasinan or sugar in Negros. The majority of the population are farmers, and the welfare of the country lies essentially in its agricultural prosperity. (About 95 per cent of the export of the Philippine Islands are agricultural products.) The best proof for their conservative character is that to-day, under the present ruinous conditions for the tobacco culture in the islands, the natives of the respective districts will not leave their homes and try some other part of the archipelago; they will not even cultivate other products on their present land, except the little corn or other victuals for their own needs. They are not restless, but content if they are left alone and can derive the means for the necessities of life from the product of their labor. But the majority will not overwork themselves and only a few will try to save money, either for themselves or for their children. Their work is by no means comparable with the assiduity of the Chinese, as some people in the United States still believe. The average Philippine native is also physically not strong enough to stand prolonged and severe field work.

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As to the wages, they are certainly lower than those paid in the United States, in harmony with the different standards of life, but does not the American farmer or workman produce the same amount of work as two or three Filipinos? Besides, the American laborer works in the temperate zones, where the efficiency of labor is naturally greater than in a hot, enervating climate.

As far as the Filipino cigar laborers are concerned (there is not one Chinese cigar maker in Manila to correct a false statement made to the contrary) their work is satisfactory on the whole, and it is relatively quite a large number of people who have learned this particular branch of work. The present number of cigar makers in Manila (i. e., people who actually make the cigars, not other laborers engaged in the industry), may be 8,000 to 10,000 men and women, of whom, say about one-half, know how to make Cuban style cigars (spiral wrappers). The others, mostly women, produce only Philippine style cigars (straight wrappers). This number of Cuban style cigar makers could perhaps be increased to 7,000 or 8,000, not more, because there are no more people available who have been taught this profession, and it is well known that it requires many years before a man gains sufficient practice to make a well-rolled cigar of the Cuban style.

There is no "cheap labor" in the Philippine Islands, taking the efficiency into consideration, as must necessarily be done. Moreover, with a better sale of our cigars the present scale of wages would not be maintained, but would have to undergo a considerable rise; just by how much the writer would, for obvious reasons, rather abstain from guessing.

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Here the following circumstance deserves special mention. Manila hemp abaca is an article which can not be produced anywhere in the world except in the Philippine Islands, and its demand is steadily increasing; now, if such a plan as proposed by Senator Dietrich were practicable, why have not all Filipinos already gone to produce hemp only? It is frequently asserted that there are still vast territories in the provinces of Albay, Camarines, and the Southern Islands where the abaca plant is found in abundance, but allowed to rot for want of labor. Wages of several dollars a day are paid in those districts to people who will prepare the fiber for the market, and still labor is lacking. Why is there no rope factory of importance in the Philippine Islands, considering that the raw material grows there? Because there is no such thing in the islands as cheap labor. The labor to-day available there is, generally speaking, worth no more than it is paid for, and sometimes considerably less.

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APPENDIX 4.

Rates of import duty.

1. In the United States, under the Dingley tariff:		
(*a*) On tobacco—		
Stemmed—		
Wrappers	per pound	$2.50
Fillers	do	.50
Unstemmed—		
Wrappers	do	1.85
Fillers	do	.35
(*b*) On cigars—		
Stemmed	do	4.50
Unstemmed	per cent ad valorem	25
2. In the Philippine Islands:		
(*a*) On tobacco (wrappers and fillers), 50 cents United States currency per kilogram=about	per pound	.22½
(*b*) On cigars, $2 United States currency per kilogram=about per pound		.91

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APPENDIX 5.

Estimates of the annual production, export, and domestic consumption of Philippine tobacco.

	Quintals.
Production (in good years):	
Cagayan	120,000–150,000
Isabela	110,000–130,000
Union	80,000– 90,000
Ilocos Norte and Abra	40,000– 50,000
Barili	80,000–100,000
Other Visayas	70,000– 80,000
Total	[a] 500,000–600,000

Used as follows:

	Quintals.	Quintals.
1. Exports:		
Leaf tobacco (all kinds)	[b] 190,000	
Cigars (all Isabela and Cagayan, including Filipino style cigars), say 120,000,000 at 30 pounds, including stems and waste, per 1,000	36,000	
Cigarettes (as per statistics of Bureau of Insular Affairs), valued at $20,699, at say $15 per 1,000 packages, 1,380,000 packages of 90 pounds per 1,000	1,240	
All other manufactured tobacco (as per same statistics)	1,170	
Total exports		228,000
2. Local consumption:		
Cigars (all Isabella and Cagayan), say 50,000,000, at 30 pounds per 1,000	15,000	
Cigarettes (former output, i. e., before enactment of the internal-revenue law; all kinds of tobacco), about 332,000,000 packages at 90 pounds per 1,000 packages	299,000	
Local consumption, total		314,000
Total used		542,000

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APPENDIX 11.

Details about the Philippine tobacco trade.

2½ acres=1 hectare.
1 quintal=46 kilograms=101.41 pounds English.
1 mile=1.609 kilometers.

There are about 50 to 60 cigar and cigarette factories in the Philippine Islands between large and small establishments, those of more or less importance being La Insular, Flor de la Isabela, Germinal, El Oriente, Paz y Buen Viaje, Alhambra La Yebana, Alejandrina, Maria Cristina, Urania, Union La Rosa, Aguila Real, Comercial, etc.

Philippine tobacco (good quality for cigars) costs in Manila to-day, say 10 to 20 cents (United States currency) per pound for filler and 15 to 30 cents per pound for wrapper.

The present prices of Manila cigars are the following:

Filipino-style cigars (straight wrappers), not exportable to the United States, weighing 10 to 18 pounds per 1,000, prices per thousand, $6 to $12 (United States currency).

Cuban-style cigars (spiral wrappers), weighing 15 to 30 pounds per 1,000, prices per thousand, $12 to $15 (United States currency).

A middle-sized cigar weighs about 18 pounds per thousand and costs to-day about $25 (United States currency) per thousand. The amount of leaf used for

[a] 50,000,000–60,000,000 pounds.

[b] 19,000,000 pounds, whereof about 10,000 quintals (1,000,000 pounds) is wrapper; 40,000 quintals (4,000,000 pounds) filler, and 140,000 quintals (14,000,000 pounds) ordinary leaf.

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such cigar is about 30 pounds per 1,000, i. e., unstemmed leaf and including the waste.

The cigar-maker's labor is to-day paid for from $2.50 to $12.50 (United States currency) per 1,000 Cuban-style cigars; the labor on the 18-pound cigar is $5.50 to $6 (United States currency) per 1,000. A cigar-maker's foreman receives to-day about $20 to $30 (United States currency) per month. A native overseer or technical manager in the cigar factories in Manila receives from $75 to $150 (United States currency), and in the larger establishments some employees of this category earn considerably more. The wages for packers and similar workmen are about $13 to $15 (United States currency) per month on the average; the ordinary laborer, if paid by the month, receives from $10 to $15 (United States currency).

All these wages are considerably less than the rates which should be paid to them, as compared with former wages (about 20 per cent less), taking in consideration the enhanced cost of life, say by about 100 per cent or more.

Cuban-style cigars are fine specimens of workmanship, the wrapper being applied to the cigar without gum, except at the top by a bit of gum, the spiral of the wrapper making only four to five rounds.

Filipino-style cigars are ordinary cigars, the wrapper being applied to the cigar with a big supply of gum, in a straight manner, i. e., not spiral. A skilled workman can produce in a day 100 to 125 Cuban-style cigars, whereby he may gain about $15 to $19 gold per month on the average.

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APPENDIX 14.

THE GOVERNMENT OF THE PHILIPPINE ISLANDS,
DEPARTMENT OF THE INTERIOR, BUREAU OF AGRICULTURE,
OFFICE OF THE CHIEF OF BUREAU,
Manila, P. I., December 6, 1904.

SIR: In answering your request for information as to the probable limits of successful tobacco production in these islands, I will say that at the present time the only good tobacco raised in the islands is confined to one river valley—the Cagayan, in northern Luzon.

From the weather records I see that there is no other spot in the islands having the same amount of rainfall and other climatic conditions so suitable for successful tobacco growing. It is a fact, furthermore, that good tobacco can not be grown anywhere in the world near salt water—probably within 10 miles of any seacoast or salt-water inlet. In fact, the different experienced growers and members of the trade here tell me that the distance from the seacoast necessary to grow good combustible tobacco is 20 to 30 miles.

If this be the case, certainly no very great things may be expected in the way of volume of produce from these islands under any conditions, as the tremendous amount of seashore surrounding the various islands of the archipelago would render the area of successful tobacco growing very small indeed.

The interior of every island is mountainous, and the rainfall so great that the successful raising and curing of tobacco would be absolutely impossible in all of these regions.

Most of the level lands and alluvial lands of the entire archipelago lie within 10 to 15 miles of seashore, and in these districts is found the bulk of the population. My own opinion is, from observing the slow way in which people here change their methods of doing business, that even if districts other than the Cagayan Valley—which now perhaps grows nearly all the tobacco it is capable of growing—should be found suitable for raising good tobacco, it would be fifty years before the industry would spread considerably to any other new sections.

For instance, the Pampanga Valley is devoted almost entirely to rice, sugar cane, and corn. I understand that it has been so since the recollection of the earliest inhabitants. The people in this valley, as elsewhere, are as conservative as the Chinese about changing their practices. Regardless of the possible profits in tobacco or other new crop, I do not believe fifty years would suffice to bring about any very considerable change in the crops they are producing.

Hoping these suggestions may be of some service to you, I am,

Very truly, yours,

W. C. WELBORN, *Chief of Bureau.*

Mr. A. DETERMANN,
Care of Baer, Senior & Co.'s Successors, Manila.

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[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States Senate, p. 281–357. Reprint public hearings in Manila, P. I., August 9, 1905.]

MANILA, *August 9, 1905.*

STATEMENT OF MR. P. KRAFFT, OF THE FIRM OF BAER, SENIOR & CO.

(1) Cultivation of leaf tobacco.

I have drawn a map showing the actual regions under cultivation, the various colors representing the different grades of the quality. I also marked those regions which some time ago were under cultivation and which now are deserted on account of want of demand. A single glance at the map will give ample explanation that the fear in this direction has no reason to exist. It is an absolute fact, which can not be refuted, that all tobacco grown on the seashore or in the vicinity of it is of bad burning, be it grown here in the Philippine Islands, Sumatra, or in Java. I marked the bad quality, which is of no use, in blue. This is tobacco which burns black ashes only, and which is very inferior in quality.

The map which I have prepared is over there [pointing to a map which had been placed upon the rostrum].

(The map submitted by Mr. Krafft was one with the tobacco-growing sections shown in different colors to indicate where those sections were located and the quality of the leaf grown in each region. The different sections were colored in accordance with the following schedule:

Red: Section growing tobacco of good quality.

Yellow: Tobacco of satisfactory quality, a small proportion being fit for cigars.

Green: Tobacco of inferior quality and doubtful burning; not fit for cigars.

Blue: Tobacco of bad quality, bad burning; not fit for cigars.

Blue, inclosed by a circle: Tobacco of bad quality; very inferior; cultivation discontinued last year.

The regions colored in accordance with the above schedule are as follows:

Red: A strip along the Cagayan River in Isabela Province down to a little north of the Cagayan boundary.

Yellow: Along Cagayan River, from a little north of the Cagayan boundary line down to Amulung and along the Chico River to a little below Santo Niño—all in Cagayan Province.

Green: Along the Cagayan River, from Amulung to a little below Nasiping, Cagayan Province; also small sections in the interior of the Provinces of Ilocos Norte, La Union, Pangasinan, Nueva Ecija, and Cebu.

Blue: Small sections in the provinces of Abra, Ilocos Sur, and La Union along the seacoast, and along the west coast of Cebu.

Blue inclosed in a circle: Small sections in Batangas, Capiz, and Romblon.)

Representative COOPER. Mr. Chairman, will you permit me to suggest that the gentleman point out on the map and explain these different sections devoted to tobacco growing?

Mr. KRAFFT. Yes, sir; here is the map of the Island of Luzon, showing where lands are used for tobacco culture, the quality of the leaf being indicated by the coloring. You will notice that the only section where a good quality of leaf tobacco is grown is in Cagayan Valley, in this section here [pointing to the section colored in red]. Everywhere else the tobacco is of more or less inferior quality, while in Batangas it is so poor that the cultivation was abandoned last year.

Representative COOPER. About how many acres devoted to this inferior quality of tobacco is represented in Batangas, which you say was abandoned last year?

Mr. KRAFFT. A very few acres; in former times they produced from 5,000 to 8,000 quintals.

Senator LONG. Is the land shown on that map as colored the only land upon which tobacco is grown?

Mr. KRAFFT. Yes, sir; there are no other lands, except those I have marked. This shows that the area under cultivation in the islands is very small, as you will see.

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Mr. KRAFFT again reads from his paper, as follows:

The area marked in green shows a somewhat better quality, but still remains unfit for making cigars, and only those regions which are marked in red and yellow represent a quality fit for cigar leaf.

Looking over the map, there is only the island of Luzon, and particularly the valley of the Cagayan River, which produces this tobacco. All other islands show a poor opportunity to raise good tobacco. As far as Mindanao is concerned, I am not able to give reliable information. I can only say that in former years tobacco was brought to Manila from there of an inferior quality. It therefore results that only the Cagayan Valley comes into the question. As the production there only averages 20,000,000 pounds a year, it must be said that in comparison to the cigar leaf produced in the United States, which amounted in 1904 to the respectable number of 140,000,000 pounds, it can not influence the price in the United States. There is still another fact which gives force to my foregoing assertion. The tobacco grown in the Cagayan Valley is sometimes of very different quality, according to the relations of dry and humid weather which exist during the growing. If the weather remains too dry during the months from December to April, without rainfall, the tobacco leaf turns out narrow, small, thick, and charged with gum and nicotine. Such tobacco is only fit for cutting purposes for our home cigarettes and for chewing tobacco, and can only be used for cigar making after the lapse of several years. It is, moreover, a fact that out of four crops only one is suitable for cigar leaf, and another fact is that too heavy rains produce a leaf which is neither good for cigars nor for cigarettes, as it is completely washed out and exceedingly liable to get worm-eaten and moldy. Moreover, it must be mentioned that tobacco can only be grown during the months of December to April on account of the succeeding inundations of the Cagayan River during the rainy season which cover the immediate banks of the river, leaving a rich deposit of vegetable manure. It can be proved that the tobacco grown in the upper fields, which are never subject to inundations, shows a poor quality. There are still other arguments to show that the cultivation of leaf tobacco in the Cagayan Valley has to meet with the consequences of typhoons and inundations setting in before the crop is harvested. It must also be stated that the greater portion of the land fit for cultivation is already under cultivation.

Mr. KRAFFT. Now, gentlemen, if you would like, I will show you some of the different classes of leaf tobacco grown in these islands; I have brought samples of the different qualities. This [holding up a bundle] is a poor quality.

Representative COOPER. How much a pound does that class of tobacco bring?

Mr. KRAFFT. About 9 centavos.

Senator LONG. To what countries is it exported?

Mr. KRAFFT. It is not exported; it is consumed in Manila. This grade is too poor for export to Europe or elsewhere; it is all consumed locally.

Senator LONG. What do you use it for?

Mr. KRAFFT. We mix it with other grades of better quality and make cigarettes out of it.

(The speaker here submitted to the inspection of the visitors a number of different grades of tobacco leaf, which were inspected by a number of the party.)

Mr. KRAFFT. This piece here [exhibiting a bundle] comes from the province of La Union, it is a poor quality; if you wish to see how it burns, I will light it.

The CHAIRMAN. Light a piece of it and let us see.

(The speaker ignites a leaf.)

Mr. KRAFFT. You will notice a very disagreeable odor.

The CHAIRMAN. It smells something like a Wheeling stogie.

Representative COOPER. What do you use that kind of tobacco for?

Mr. KRAFFT. On account of its having a poor leaf we send it to the countries having tobacco monopolies in Europe, such as Austria.

Representative COOPER. What does it sell for?

Mr. KRAFFT. About ₱10 or ₱8 per quintal.

Representative PAYNE. Have you any specimens of the best leaf produced in the islands?

Mr. KRAFFT. Yes, sir; I have some here [exhibiting a bundle]. This is Isabela leaf; it is the best we grow.

Representative PAYNE. What does this cost a pound to produce?

Mr. KRAFFT. We are selling it for ₱60 to ₱70 per quintal.

Representative PAYNE. What percentage of the crop is suitable for wrappers?

Mr. KRAFFT. Only a small percentage; sometimes when the crop is very

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"fat" there is no wrapper at all. I think perhaps 5 per cent turns out in such a way that we can use it for wrappers—yes, 5 per cent. That would be a very satisfactory result.

Representative PAYNE. Is there any part of it suitable for binders?

Mr. KRAFFT. Yes, sir; for binders and fillers.

Representative PAYNE. You say only about 5 per cent is suitable for wrappers. Where do the binders or fillers go for consumption?

Mr. KRAFFT. Here in the islands; the greater portion is sold here.

Representative PAYNE. Some part of it goes abroad?

Mr. KRAFFT. In former times, yes; but not now. Now they do not want any of our tobacco except of the cheapest grades.

Representative PAYNE. To what countries was it exported before?

Mr. KRAFFT. We sent some to Holland, to Belgium, and other countries. If you will pardon me, I will continue reading my statement.

Mr. Krafft then read from his paper as follows:

(2) Production ad infinitum of Manila cigars.

As a consequence of the facts shown before, the manufacturers' supply of suitable leaf is limited. Therefore, the principal element being relatively scarce, the extension of cigar making is also limited. Moreover, it must be borne in mind that cigar making can not be learned from one day to the other. The cigar makers of Manila enter the factory as apprentice boys and are gradually taught the profession, beginning with stripping the leaf. It requires many years of daily occupation to have the fingers drilled in such a way as to be able to make a perfect cigar. In the recent Philippine census the number of cigar makers in the Philippine Islands is given as about 5,000. One cigar maker can turn out about 30,000 cigars yearly, taking as an average 600 per week, and taking the 5,000 men as now existing there would result about 150,000,000 cigars a year if all would or could make better-class cigars.

In order to do away with misunderstandings I should like to mention that there exists a divergence of opinion with experts in the United States and here in the Philippine Islands about the quality of cigar leaf, especially as far as wrapper is concerned. What is styled as wrapper in the United States is quite a different thing from what we used to call it here. Our cigar industry has not a necessary quantity of suitable leaf at its disposal on account of the thickness and bad color of the raw material, and often is compelled to fall back on leaf which in the United States would only be employed as bunches or fillers. The wrapper leaf which is exported hardly merits this denomination. Exports to Holland and Belgium, which countries in former years, before the appearance of the Sumatra tobacco, almost exclusively used Manila tobacco for this purpose, have now come to a standstill, and there is now only wrapper leaf exported to Spain and other countries having tobacco monopolies. Moreover, I wish to call attention to the fact that in the United States, as well as all over the world, the consumer has a marked tendency to smoke light-colored cigars, and it is a fact that light-colored wrappers are extremely scarce here in the Philippine Islands. It forms another proof that the fears entertained that Manila cigars with their dark color would probably constitute a serious menace to the home industry are groundless. Sumatra tobacco is imported in large quantities into the United States, which in 1901, as per Bulletin No. 28 of the United States Department of Agriculture, amounted to 6,250,000 pounds, valuing $5,600,000, and being 95 per cent of all the wrapper tobacco imported into that country, the average price of 1 pound being about 90 cents. As $1.85 per pound duty is paid and it requires 1 to 2 pounds of good wrapper to cover 1,000 cigars of average size, the outlay of a cigar manufacturer for this item is $3.70 for duty and for raw material $5.50.

For covering 1,000 cigars with Philippine wrappers a cigar maker would probably require 8.10 pounds at least. Taking 8 pounds, and considering the reduction of 25 per cent on duty, he would pay $11.10 for duty and for raw material $3.20, making a total of $14.30.

In case of a reduction of 75 per cent we would still pay $3.70 for duty and $3.20 for raw material—altogether, $6.90—so that the American manufacturer would prefer to buy Sumatra leaf, not only for reason of calculation, but on the basis of having a light wrapper of uniform color, while employing Philippine leaf he is at a great disadvantage.

The CHAIRMAN. With reference to the number of cigars made by a man in a week—what wages do you pay?

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Mr. KRAFFT. We pay wages according to the size of the cigar made and the number a man can make; it depends upon the cigar maker's ability.

The CHAIRMAN. You pay the cigar makers by the piece, then. How much do they earn?

Mr. KRAFFT. Yes, sir; we pay them by the piece. A man will earn ₱8 or ₱10 a week or more; it all depends upon his ability.

Representative CURTIS. That is $4 or $5, gold, a week?

Mr. KRAFFT. Yes, sir.

Representative HILL. If you can buy Sumatra wrappers at $5.50 and Philippine wrappers cost you so much, how is it that you don't use Sumatra wrappers? According to your data you figure that Philippine wrappers cost $6.90 and Sumatra wrappers $5.50. Why don't you save $1.40 and use Sumatra wrappers?

Mr. KRAFFT. Well, there is a reason for that. We have tried to use Sumatra wrappers, but have not made a success of it. The Sumatra leaf is a much more delicate leaf than the Philippine tobacco, and our cigar makers are accustomed to using a strong leaf; and in handling the Sumatra wrapper, unless a man is very careful he destroys about 50 per cent of it or renders it unfit for use as a wrapper. One pound of Sumatra wrapper ought to cover 1,000 cigars, but I have made trials of it here and have had men ask me for 6 pounds to cover that amount, due to the fact that they spoiled so much of the leaf.

Representative HILL. How much Philippine wrapper do you use for 1,000 cigars?

Mr. KRAFFT. It depends upon the quality; the tobacco that we use for wrapper has so many rents and holes in it that sometimes it will take 8 or 10 pounds of it to cover 1,000 cigars.

Representative HILL. Take the ordinary Isabela leaf?

Mr. KRAFFT. Perhaps 4 pounds would be enough to cover 1,000 of the small-size cigars; sometimes at least 6 or 7 pounds are used. In this connection I would invite you to hear the testimony of Mr. Guido, who represents the Germinal Tobacco Company and is a manufacturer; he can give you more accurate information upon these points. However, I wish to say something more in connection with what I have read; there are some few additional points which should be mentioned. The methods used in growing tobacco upon the plantations owned by some farmers are very antiquated and exceedingly unbusinesslike; nevertheless they can not be improved by reason of the fact that the native sticks to his old methods and absolutely refuses to make use of better ones. Instead of having the work systematically done by performing wholesale the several processes of plowing, drying, and fermenting, and thus realizing not only a greater economy and larger output but also a better quality by the easier supervision thus possible—instead of this each family has its own piece of land, its own drying and fermenting sheds, and does its work from beginning to end in its own fashion, rendering the supervision of the expert employee a very difficult if not an impossible task. What can not be done in the estates is still more impossible with the independent native, who, left to himself, is incredibly careless and is producing a quality of leaf which is getting worse and worse from year to year and therefore less salable in the open market of the world. The per cent of tobacco grown on the estates is about 15 per cent of the whole output in the Cagayan Valley. This kind of wrapper [exhibiting a bundle of tobacco] would never have been produced under Spanish times. It would not have been permitted it is due to the carelessness of the planter—to carelessness in the fields.

Representative HILL. Do they use fertilizers?

Mr. KRAFFT. No, sir; the fields are not fertilized. Another point of importance is the transportation from the place of production to Aparri, the seaport of the Cagayan Valley. During the dry season the Cagayan River upon which the tobacco is transported to market, often gets so low as to paralyze navigation; while, on the other hand, during the rainy season the current becomes so swift as to make navigation extremely dangerous on account of the many hidden tree stumps in the river. So far as I know it is impossible to cover this risk by insurance. The freight charged is very high, so that we pay for transporting tobacco from Echague to Aparri ₱4.50 per bale of 2½ quintals, or, say, ₱18 per ton, while the rate from here to New York direct, per steamer, is about $6 gold in larger lots; in other words, it costs us more to bring freight from the tobacco fields in Isabela to Manila than it does to send freight from Manila to New York. However, the freight rates from Aparri to Manila have decreased somewhat during the last year, having gone down from 50 to 75 centavos per bale,

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or ₱3 per measurement ton. The transportation on the river inland, however, is very costly.

Representative PAYNE. The railroads will remedy that.

Mr. KRAFFT. Perhaps after some years, but it will be a number of years before we have railroads. Another thing which is a great obstacle is the insects which get into the tobacco. In the first place there is a small worm which attacks the leaf, and, unless great care is taken to carefully brush off the leaves every morning, instead of an entire leaf we get one that is full of holes. Due to the carelessness of the natives in not properly caring for the tobacco, a great deal of the product is thus affected. In fact, I think that out of 200,000 quintals in the Cagayan Valley it would be impossible to get more than 10,000 or 15,000 quintals of entire leaves.

Representative PAYNE. I didn't hear all of your statement. Did you give the prices you make at the factories for manufacturing the different kinds of cigars?

Mr. KRAFFT. I can give those prices, but there is a technical man here who will be better qualified to do so.

Representative PAYNE. Well, if there is somebody else who will give the necessary information, that will answer my purpose.

Mr. KRAFFT. There is another worm which develops while the tobacco is in the drying shed and another kind while the tobacco is fermented; during the fermentation and while the tobacco is packed there is quite a different insect which attacks it—a kind of weevil, which develops inside the leaf. The extent of this weevil pest depends upon the quality of the crop; some crops are almost free from it, while other crops are always attacked by it, especially the crops which are washed out and are of poor color and weak; therefore, unless the greatest care is used, such grades of tobacco will arrive at the factories in Manila full of worms and insects. The new crop, of which this is a sample [exhibiting a bundle of tobacco], is one of these washed-out crops and is very poor tobacco. The 1900 crop was a very good crop; it was not worm-eaten.

Representative OTJEN. Suppose the tobacco is all right and you manufacture it into cigars; is there an insect that afterwards gets into the cigars unless you wrap them in tin foil?

Mr. KRAFFT. No, sir; the insect is in the leaf itself; it does not come from the outside; it develops inside the leaf. Here is the new crop of 1905 [exhibiting a bundle]; this is another specimen of a "fat" crop. Here is a sample of a washed-out crop [exhibiting another bundle]. We had in the beginning on that crop very dry weather, and then when the crop was about to be harvested heavy rains fell and washed it out; this tobacco will prove very bad; it will be useless either for cigars or cigarettes. This other will be ready for cigarettes in two years and for cigars in eight years.

Representative OTJEN. Regarding this insect you referred to, do you know whether tobacco raised in Kentucky, in the United States, is subject to the same kind of insect or not?

Mr. KRAFFT. I have heard of it, but I do not know the facts; I don't know whether they have the same thing there or not; it would be very interesting to know.

The CHAIRMAN. Does any gentleman desire to ask any further questions?

Representative HILL. What is the percentage of wrapper in Isabela tobacco, taking it as a whole—I mean good wrappers?

Mr. KRAFFT. I would not say that there are over perhaps 1 per cent good wrappers.

Representative HILL. What is that—1 per cent?

Mr. KRAFFT. Yes, sir; that is all that can be called good wrapper; this that I have here is not good wrapper.

Representative HILL. How can you afford to pay 40 cents a pound for tobacco that has no good wrappers in it?

Mr. KRAFFT. We are making cigars out of it. However, compared with the Sumatra cigars or cigars made in the States, this product makes a very poor showing; the lack of wrappers is a great trouble with us, and the Sumatra leaf is not used here, as I have already stated. The operators here can not handle it. Then, too, during the dry season it can not be used for the reason that it dries out and is very fragile; it is very expensive to endeavor to work it here. Another reason is that if you use the Sumatra wrapper in making cigars here, and the cigars are packed in a box during the dry climate we have in the dry season here, the wrapper gets torn or cracked open.

Representative COOPER. Can you tell about how many cigars are used in the islands in a year?

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Mr. KRAFFT. I think it is about 50,000,000.

Representative COOPER. Your maximum output would be about 150,000,000; that would leave 100,000,000 for export. To what countries do you export cigars?

Mr. KRAFFT. Our exports have greatly decreased, but we are still exporting to the East—to China, Japan, India, the Netherlands, and to Australia—but these exports have decreased greatly on account of the competition we have received from the German manufacturers. The German manufacturers use Sumatra leaf, with German tobacco for a filler, which is neither bad nor good. He wraps up a very nice-looking cigar and sells it much cheaper than we can. The people in China want light-colored wrappers; this is true elsewhere also. These German manufacturers give them a light-colored wrapper; furthermore, it must be considered that the German manufacturers have no duty to pay. They import their Sumatra wrapper in bond and then ship their goods out when manufactured; they pay no duty upon this cigar leaf; that is a great advantage which we can not have here.

Representative PAYNE. What do these cigars sell for?

Mr. KRAFFT. They put this German cigar on the market there at 28 shillings per 1,000 for the Londres cigar, while we have to charge 44 to 50 shillings, and on top of that can not furnish them with light enough wrappers; they want a light-colored wrapper, so you see we are at a great disadvantage.

Representative HILL. What is the Londres cigar wrapped with?

Mr. KRAFFT. With Isabela and Cagayan leaf.

The CHAIRMAN. We will now hear the next gentleman.

Señor Justo Guido then presented a paper which was read by the interpreter, as follows:

STATEMENT PRESENTED BY JUSTO GUIDO, REPRESENTING THE GERMINAL CIGAR AND CIGARETTE FACTORY.

To the honorable the Secretary of War, the Representatives of the American people, the Governor-General, and the members of the Philippine Commission: The principal districts producing good tobacco in the Philippines are Isabela and Cagayan, in the island of Luzon. Of the tobacco from these districts of the crop of 1900, which was of the best quality, one of the lots purchased by the Germinal factory consisted of 7,932.75 quintals (806,000 pounds avoirdupois, in round numbers) of different classes, from first to fifth, costing ₱179,938.56. It was necessary properly to work up this article, on account of its good quality, and for this reason it was only used in July, 1905. From the date of the purchase to the date of manufacture the purchase value increased at this rate: Seven per cent interest for four years and nine months it was kept in the ware house at the rate of ₱0.30 per quintal per year and fire insurance at the rate of 1 per cent per year. We must take into account that these 7,932.75 quintals of tobacco, after reassessment and classification, gave the following results: For wrappers, 584 quintals and 94 pounds (59,394 English pounds); for fillers, 3,453.83 quintals (350,727 English pounds), for cut tobacco (picadura), 2,821.29 quintals (286,489 English pounds); sweepings or waste having no application in any of the branches of the manufactures of the factory; 185.03 quintals (18,801 English pounds) of sweepings or waste resulting from the operations required in the manufacture of tobacco; 48.85 quintals (4,923 English pounds) of dust having no application whatsoever; 338 quintals of shrinkage or loss in weight noted when the tobacco was reweighed prior to its manufacture. As is logical, the decline in the value of tobacco, both for fillers and picadura, and the total loss resulting from waste and sweepings as well as from dust and shrinkage, affects the total suitable for wrappers and increases their price.

Moreover, the 584.94 quintals selected for wrappers are subjected to a further selection for the brands of cigars known as Perfectos, Londres, and other common brands classified as first, second, and third classes. Of the amount mentioned of wrapper tobacco the results of classification gave 10 per cent for wrappers of first-class brands, 20 per cent for wrappers for brands of the second class, and 70 per cent for wrappers of brands of the third class. The same thing happens with regard to the leaf used for fillers, which has also to be classified in three distinct groups or classes, according to quality, in order to apply them to the different brands, the selection resulting in that 15 per cent were suitable for the first class, 25 per cent for the second, and 60 for the third;

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consequently the value of tobacco for wrappers for Perfectos increases to ₱182.50 a quintal (100 English pounds), ₱121.70 for brands of the second class, and ₱60.84 for ordinary brands; and for fillers of the three classes mentioned the resulting values are ₱80.87 for the first class, ₱53.91 for the second, and ₱26.95 for the third.

Finally, it must be taken into account that for each 100 pounds of leaf tobacco that can be used for cigar wrappers for Perfectos it is necessary to make a reduction of 25 per cent for stems and 10 per cent for waste in manufacture; so that the 100 pounds are reduced to 65, which is the net weight of the leaf that can be used. In the same manner, though in different proportion, the same allowances must be made for leaf for fillers, 25 per cent having to be deducted for stems and waste.

To give a concrete example, I will take as a basis 1,000 Perfectos in the manufacture of which enter 20 pounds of leaf tobacco for fillers and 7.69 pounds for wrappers, including allowance for stems and waste, for although it is true that the waste resulting from manufacture from the leaf used for wrappers as well as fillers is partly utilized for picadura (cut tobacco), its value is insignificant and scarcely affects the price of wrappers and fillers. If we add to the value of the tobacco that of other necessary materials, such as boxes, paper, rings, tin foil for wrapping, paper for interior lining of boxes, interior and exterior labels, and general expenses of manufacture, the value per 1,000 cigars amounts to ₱58.92, as appears in the appended table.

These 1,000 Perfectos, contained in 40 boxes of 25 cigars each, are sold by the factory at ₱60.

Now, then, if to the cost price we add the amount for duties under the Dingley tariff, freight and other minor expenses of packing, cartage to ship, unloading and hauling to warehouse, etc., the value of these cigars will perhaps be greater than similar Cuban brands, and in this case, on account of their inferior quality, they would not find favor in the markets of the United States of America.

TABLE No. 1.—*Leaf tobacco of the crop of 1900.*

REASSESSED FOR CLASSIFICATION AND PREPARATION.

Classification.	Isabela.	Cagayan.	Total.	Average price.	Value.
	Quintals.	*Quintals.*	*Quintals.*		
Wrappers	400.33	184.61	584.94	₱60.86	₱35,597.21
Fillers	2,300.31	1,153.52	3,453.83	29.32	101,283.34
Picadura	1,820.27	1,001.02	2,821.29	14.00	39,498.06
Waste	300.76	200.05	500.81	6.00	3,004.86
Sweepings	102.46	82.57	185.03	3.00	555.09
Dust	28.08	20.77	48.85		
Shrinkage	228.00	110.00	338.00		
Total and average	5,180.21	2,752.54	7,932.75	22.68	179,938.56

INCREASE OF VALUE FROM NOVEMBER, 1900, TO JULY, 1905.

Classification.	Interest, 7 per cent per year for 4¾ years.	Insurance, 1 per cent per year for 5 years.	Storage, ₱0.30 per quintal per year for 4¾ years.	Total value in July, 1905.	Price per quintal.
Wrappers	₱11,629.61	₱1,779.86	₱818.92	₱49,825.60	₱85.15
Fillers	33,089.27	5,094.12	4,835.36	144,302.09	41.78
Picadura	12,904.02	1,974.90	3,949.81	58,326.79	20.67
Waste				3,004.86	6.00
Sweepings				555.09	3.00
Total	57,622.90	8,848.88	9,604.09	256,014.43	

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Selection made of the above leaf tobacco for separation into three classes corresponding to similar groups of select cigars.

FOR WRAPPERS.

Selection in classes.	Proportion of selection.	Quintals selected.	Proportion of price.	Price per class.	Value per class.
	Per cent.				
First	10	58.49	6	₱182.50	₱10,674.42
Second	20	116.99	4	121.70	14,237.67
Third	70	409.46	2	60.84	24,913.51
Total	100	584.94			49,825.60

FOR FILLERS.

	Per cent.				
First	15	518.07	6	₱80.87	₱41,895.27
Second	25	863.46	4	53.91	46,557.99
Third	60	2,072.30	2	26.95	55,848.83
Total	100	3,453.83			144,302.09

Table of cost of production of 1,000 Perfecto cigars having an approximate weight of 20 pounds per 1,000.

Item.	Quantity.		Cost.
	Per cent.	Pounds.	
Leaf tobacco:			
For wrappers—			
Available	65	5.00	
Waste	10	0.77	
Stems	25	1.92	
Total	100	7.69	
Cost of 7.69 pounds, at ₱182.50 per quintal			₱14.03
Less 0.77 pound wastage available for picadura, at ₱20.67 per quintal			.16
Total cost of wrappers			13.87
For fillers—			
Available	75	15	
Stems and waste	25	5	
Total amount of fillers	100	20	
Cost of 20 pounds, at ₱80.87 per quintal			16.17
Total cost of leaf tobacco			30.04
Materials:			
Boxes for 25 cigars, 40, at ₱10 per 100			4.00
Rings, ₱1.05 per 1,000			1.05
Tin foil, 1 kilogram			2.50
Paper used as interior lining of boxes			.35
Labels outside and inside for 40 boxes, at ₱45 per 1,000 sets			1.80
Total for materials			9.70
Manufacture:			
Selectors of leaf tobacco			.30
Stemmers, 28 pounds leaf tobacco for wrappers and fillers			.28
Selection of leaf for wrappers			.30
Making, per 1,000			13.20
Putting on rings			.15
Wrapping in tin foil, per 1,000			2.50
Packers, per 1,000			.37
Sealing			.10
Total for manufacture			17.18
General expenses			2.00
Cost of total production for 1,000 Perfecto cigars			58.92

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[Same Hearing, page 355.]

STATEMENT OF A. LACSON.

ILOILO, *August 15, 1905.*

The "Manuel" estate, in the municipality of Talisay, Occidental Negros, P. I., the property of the undersigned, contains 200 hectares of second-class land suitable for sugar cane and an 8-horsepower steam mill, with the necessary appurtenances, buildings, etc., as follows: One mill house, two bagasse sheds, one sugar warehouse, and one dwelling house, all built of lumber with galvanized-iron roofs, valued at ₱20,000, and 100 head of carabaos, valued at ₱15,000; total, ₱35,000.

Expenses.

To plowing 100 hectares, labor of 50 men from July to November, five months, at ₱10 per month each, including food	₱2,500.00
To planting 250 lacsas (2,500,000 points), 50 laborers	1,000.00
To wages of 50 laborers in the cultivation and care of the cane for a period of seven months, at ₱10 per month, including food	3,500.00
To cutting and cartage of cane, estimated at 5,000 piculs, at ₱0.40 per picul	2,000.00
To expenses of grinding, using bagasse as fuel for the mill, and boiling sirup, by contract, at ₱1 per picul	5,000.00
To 50,000 pieces cordwood for boiler, at ₱20 per hundred pieces at mill	1,000.00
To 13,000 empty sacks for packing, at ₱5.50 per hundred	715.00
To 30,000 pieces rattan for packing, at ₱6 per thousand	180.00
To 10 per cent loss in cattle valued at ₱15,000	1,500.00
To 10 per cent deterioration of entire plant, farming implements, etc., valued at ₱15,000	1,500.00
To interest on capital, ₱7,000, for one year, and ₱8,895 for six months, at 15 per cent	1,717.10
To interest on total value of estate, valued at ₱35,000 (land, buildings, and carabaos), at 10 per cent annually	3,500.00
Total	24,112.10

So that the cost of the 5,000 piculs of sugar would be ₱24,112.10; that is, ₱4.82 per picul.

NOTE.—This price does not include expense of transportation to the Iloilo market.

A. LACSON.

Senator SCOTT. Do you raise any tobacco here?

Secretary TAFT. A little in Iloilo province, but it is not of sufficient importance to talk about.

Señor LACSON. I wish to state that I consider it an absolute impossibility for me to place my sugar in Iloilo at the price of ₱5.20, which has been given here.

Secretary TAFT. What does it cost you?

Señor LACSON. Well, I can deliver my sugar to a commission merchant or sugar buyer in Iloilo at a cost of ₱5.20 per picul, but you must remember that there are expenses of wastage and repacking. Many packages brought over are broken and have to be repacked, and then there are other expenses that have to be met.

Secretary TAFT. Do you have any rattoon crops upon your estates?

Señor LACSON. Very few; in just a few places.

Secretary TAFT. Do you know of any sugar planter in Negros that gets a rattoon crop for the third, fourth, or fifth year?

Señor LACSON. I have gotten a rattoon crop the third year by the use of fertilizers and by careful cultivation, but it has never paid me, and I wish to state that those gentlemen who have worked with rattoon crops have none of them made any money out of them.

Secretary TAFT. How much less does the rattoon crop produce than a new crop?

Señor LACSON. I should say that, weather conditions aside—that is, if we had normal weather conditions—it would lose the first year 25 per cent in comparison with a new planting.

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Secretary TAFT. Well, he did not answer my question. Does he know of any planter in the Island of Negros who gets a rattoon crop for the fourth or fifth year?

Señor LACSON. Yes; I have known, and do know, of some who have gotten four and five rattoon crops, and I have done it myself, but only on very rare occasions, and it has never paid. As a general rule, after they get the third rattoon crop they prefer to plow up the land again.

Secretary TAFT. Is it the practice through Negros to get a third rattoon crop?

Señor LACSON. When it is fresh, new land it is the general practice to get a rattoon crop.

Secretary TAFT. Well, if it is not fresh land; if it is the land ordinarily used, do they get a rattoon crop or not?

Señor LACSON. Well, on my lands—and this is also true of all planters whom I know—we do not get a rattoon crop except from virgin ground, and on all other land we make a new planting each year.

Senator PATTERSON. What was the highest and lowest price received by the planter for sugar in Iloilo during the period of ten years between 1886 and 1896?

Señor LACSON. I have not the figures with me, although I have them in my books at home. However, I remember that we used to get ₱3.50 to ₱4.50. You must remember, though, that this was gold, and was equivalent in purchasing power to ₱8 or ₱9 at the present time.

The CHAIRMAN. The hour of 12 o'clock has arrived, and the committee will have to adjourn. I would like to ask Secretary Taft when it will be most convenient to him to go on again.

[Same Hearing, page 461.]

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR—RESUMED.

UNITED STATES SENATE,
COMMITTEE ON THE PHILIPPINES,
Washington, D. C., February 7, 1906.

What we are discussing here is the growth of tobacco and the growth of sugar. The experience with respect to tobacco all over the world—and it is confirmed by Mr. Frye, of Connecticut, who, I suppose, has had as much experience as anybody in the practical raising of tobacco, and also as much knowledge of tobacco all the world over—is that in every country the amount of tobacco land—that is, tobacco land that will raise good tobacco—is a very small percentage of the total area available for agriculture. Tobacco is a plant, first, which exhausts the soil; and, second, it is a plant which is most sensitive to the chemical character of the soil. So it is that in the United States but one twenty-eighth of 1 per cent of all the lands is devoted to tobacco; in the Philippines it is one-ninth of 1 per cent.

Now, it is altogether unfounded and incorrect to assume that the soil and the agriculture in the Philippines is in a state of infancy. The Spanish Government was there for three hundred years, and they for a long time maintained a monopoly in tobacco and sought the land, and using labor as they did, by what was slave enforcement, cultivated the land where it was supposed to be most productive. So with respect to sugar, although that is not so sensitive, the character of the yield depends very much upon the soil. They have been acquainted with the raising of sugar in the islands for a very long time, and they have confined their profitable raising of sugar to two provinces, those of Pampanga and Occidental Negros. There is a good deal of sugar raised in Panay. Sugar will grow, as corn will grow, in almost any soil, but the profitable raising of the crop is a very different matter. I ought to add that sugar requires an immense capital when cultivated upon modern ideas, the calculation being that for all the plant it requires about a million-dollar investment for the production of 15,000 tons.

It is not confined to sugar and tobacco, this choice of land in the Tropics. Take the matter of hemp, which is the monopoly of the Philippine Islands. That has to be cultivated under particular climatic conditions and in particular soil. I am glad to say that there is every prospect that the land available for hemp is probably more capable of increase than that of any other plant in the islands, unless it be rice, for the reason that in the hemp provinces where this

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hemp is cultivated there are vast tracts of mountain lands upon which hemp grows best—in the island of Samar and the island of Leyte, in the southwestern portion of Luzon. Even in some of the western portions of the islands it has been found that hemp will grow. Hemp being a monopoly, and hemp being capable of cultivation with a very little expenditure of capital, is, of course, the industry into which the energy of the islands will naturally direct itself.

Now, coming down to the available area of tobacco in the tobacco provinces, the census shows that 90 per cent of the tobacco lands in Cagayan are owned by small farmers; that 75 per cent of them in Isabela are owned by small farmers, and that only 15 per cent are owned by large companies. This is a direct outgrowth of the history of the cultivation of that plant. The Spanish Government maintained a monopoly with respect to tobacco for one hundred years or more, and directed the employment of labor by slave methods throughout that territory until the people rose. Thus the Spaniards found such difficulty in maintaining their agriculture as a government monopoly that they gave it up. A transfer was made to the people who had been employed as laborers in the tobacco business of the small holdings, and they became the small farmers of Cagayan and Isabela.

Now, the business of the tobacco manufacturers and the tobacco seller in the Philippines is not that generally of raising tobacco, but it is buying tobacco; it is going into each of those small towns in Cagayan and Isabela and buying from a family the tobacco that it produces, and the necessary effect on that agriculture is to make the agriculture poorer and poorer, for the reason that the labor is that of the children, of the women, and of the men who will not take the pains necessary to make good tobacco. Tobacco in the Philippines is subjected to all sorts of attacks by insects, and it requires therefore for its proper maintenance the greatest attention, patience, and industry. And what is the result? It is not given to the plant, and so tobacco leaves come in with wormholes, and all sorts of objections to its marketable value.

Now, how are you going to improve that? The average population in Cagayan and Isabela is 23 to the square mile. There is very little, if any, movement of population into those two provinces. Compare that with the opportunity for obtaining labor in Connecticut or Pennsylvania, or the opportunity in Porto Rico, where the average population is 230 to the square mile, and where are you going to get the additional labor, even if you could make it useful in those two provinces? Those are the two provinces that we have been trying to reach by railroads in the Philippines. We have offered to furnish the bonds by which the railroad is to be constructed—that is, to guarantee the bonds—and we get no bids. Why not? It is because the two provinces are so lacking in population (for population and passenger travel in the Orient is what makes the dividends for the railroads), even with this Government assistance, we can not get railroads into that region. It is the most backward region in the entire Christian part of the islands, except, possibly, that of the Negritos in the mountains and the Pulahanes of Samar.

Now, I do not claim to be an expert with regard to land, or anything else in the Philippine Islands, but it is possible that I ought to qualify myself with reference to some of my statements. Some of these are made simply on information, as I gather them by studying the subject, and some by actual experience. One of the most valuable experiences to me was the investigation which I had to make, by calling witnesses, and by making inquiries wherever I could make them, in purchasing 400,000 acres of land from the religious orders in the Philippines, and of this land there was an estate which had been voted or given to the Augustinian order sometime in 1880, I think it was, of 60,000 acres in the province of Isabela, and the question was what we would pay for that estate. I had no means of going there—I had been up in Isabela, and had been on the estates of the Tabacalera Company, which is the company having the largest capital in the islands. The estate is a 60,000-acre estate, a little farther up the Cagayan Valley. I did not have opportunity to visit it. I went to Mr. Weber, who was a German, and one of the heads of the Tabacalera Company.

By the way, I ought to say right there that the assumption that there is nobody in the islands who knows anything about agriculture, and that they require the introduction of American agriculturists to make a complete reformation, has very little foundation. The Tabacalera company is a very rich corporation. It deals in hemp, in sugar, and in tobacco, and it has at the head of it Frenchmen, for a large part of its capital is owned in France, and it has in the active management of it on the estate this German gentleman, Mr. Weber.

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Mr. Weber knew this Augustinian estate. I had been with him on the Tabacolera estate. He pointed out that the only acreage that he could use on his estate for tobacco was that which was down on the river-bottom land where there is an overflow every year. With reference to this Augustinian estate, he said, "I know it; I know there is a portion of that that can be used for tobacco purposes." "Well," said I, "what will you give me for the estate? Suppose I were to buy it for the Government, what would you give?" "Well," he said, "I would buy on one condition, and on only one, and on that condition I will give you $200,000 gold for it—for the 60,000 acres." "Well," I said, "what condition is that?" He said, "It is that the Commission"—he had that same vague idea with reference to the powers of the Commission that some people in the islands have—he said, "It is on condition that you will allow me to introduce as many Chinese laborers into that plantation as I can, and wish to." I said, "Why?" He said, "Because otherwise the estate is worth nothing." Now, in the sale, I offered $150,000 gold for that estate, and I supposed it was a fair price. When it came to the negotiation between the three orders, for that which I offered was treated as a lump sum, the sum was divided up between the different orders with reference to their valuation of the estate, and they cut down our Augustinian brothers just about one-half from the price which I had stated I was willing to pay and which the Commission subsequently approved.

Now, I think that illustrates the character of the statements with reference to the possibilities of the land. There was a company with millions of capital behind it who had all the experience, knew the labor, and knew all the other conditions, and yet they utterly refused to take it at all unless it had this imposition, this exclusion removed with reference to the Chinese labor. That only reflects the same thing that you will find in the statement of the commissioner of internal revenue of the islands, which, with the permission of the committee, I would like to insert in my evidence, not at length, but sufficiently to show just what is true with reference to the cultivation of tobacco in those islands.

Now I come to sugar. Occidental Negros is a great province for the raising of sugar. There are in that province 2,000,000 acres; of that a large part, I should say one-third, is hopelessly dense forests that has never been investigated by man. I do not mean that the Negritos do not run through it, but it consists of dense forests and jungle, so that a man gets lost in it and is never found. Perhaps two-thirds of the whole is quite mountainous; much of this rocky waste. The part that is used for sugar is what Mr. Hathaway describes as a coastal plain. His dimensions are erroneous. The coastal plain that he describes is from one to ten to fifteen miles wide. Much of that has been under cultivation for years. They do find that in certain cases, just below the hills where the soil washes down from the mountain streams, so as to form a rich alluvial soil, they do find places where it is possible to raise what they call rattoon crops—that is, crops that are not planted each year, but which follow from plantings of the previous years. They have in such instances two, three, and four, and sometimes in exceptional cases as high as eight rattoon crops.

But that is altogether the exception in Negros, and the average production throughout the island in the first-class sugar lands is from a ton to a ton and a quarter an acre. This I am able to state because I investigated the question. We had some friars' sugar land to buy in Cebu and in Cavite and Bulacan. The average yield, you will find, of the first-class land, as stated by Señor Luzuriaga, for five years, is that there will be one bumper crop; that there will be two average crops, and two that are bad crops. That is, 80 piculs per hectare for one year, 60 piculs for two years, and 25 piculs for two years, and if you will calculate that you will find that it is just about a ton to an acre on the average in the five years—perhaps from a ton to a ton and a quarter.

Now, in Negros there are in farms 420,000 acres; there is cultivated 168,000 acres, and 82 per cent of this is in small farms. In Pampanga there are 550,000 acres. Of these, 250,000 acres are set off in farms, and 60 per cent, or 150,000 acres, are cultivated. Now, I ask you gentlemen to go into your own census. Take the States that you suppose to be best cultivated and compare the percentage of the cultivated land in those States with these percentages and see what the difference is between the two. I venture to say that you will find that the advantage is in favor of the percentage of cultivated lands in Negros and Pampanga. So that this theory of an indefinite expansion in sugar is all a theory; it is all in the air.

I quite concede that we all of us have had dreams, and when I was here, after I came back from the islands, after having heard, as Mr. Gove calls them,

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my poetic fellow-citizens of the Philippines describing the beauties of the land upon which they live, I did say before some committee that if we were given all the advantages that could be given us we would raise as much sugar as they do in Cuba. But when I was here I was subjected, I think, to thirty-five days of examination by this committee, and I was carried over every subject that could possibly suggest itself to the inquiring mind of the Senatorial investigator, and was interrogated on a great many questions with reference to which I had no accurate knowledge. But now we have a census; now we have gone into this matter, and now I have made an investigation into the value of the lands in the Philippines and into the actual production, and these are the facts as I have learned them.

Now, to come back to general conditions as to labor, in the street railways of Manila they pay 80 centavos a day to the common laborer and give him a breakfast. The street laborer for the government gets 100 centavos a day; that is, 50 cents gold, in the agricultural labor. They point to Lagranja as a place where you can raise 10 rattoon crops a year, and it is just going to increase the supply by making 6 tons to the acre in the Philippines. My brother Hathaway is not without some Philippine imagination on that subject. Now, what is the fact? We have to pay to the laborers there 30 cents in gold a day, and what is the fact with reference to the cost of raising sugar there? It cost us last year just 3 cents a pound with all the 10 rattoon crops a year, and everything else, painted with the somewhat deep colors of my friend Hathaway's statement.

Mr. Wheeler, who is in Negros now, engaged in cutting forests in that island, has imported labor. He could not get his labor in Negros, so he had to import it from Iloilo, and he paid from 25 to 37½ cents gold, and has to transport the rice from Manila to his place for nothing. He does not give them rice for nothing, but he gives it to them at Manila prices, and he gives them other privileges with respect to housing, etc. He brought 200 laborers. If the demand for labor is to be increased, as I shall show you, it must increase in order to have any effect whatever on the American market, the increase in labor is going to be such, first, that it will double or treble the prices. Indeed, the limitation in reference to the number of laborers that you can get, considering their character and their disposition to labor, is absolutely prohibitory beyond a certain acreage.

Now, in the hemp fields the question is whether the labor in the Philippines is sensitive to the demands, is sensitive to those questions of its supply, and the necessity for calling on it. In the hemp fields a skilled hemp puller, on shares—because that is the way they have to pay them there—earns $2 gold a day. I agree that that is an exceptionally first-class man, because the work is hard, but the average earning is a dollar gold a day. Hemp is the profitable industry. Hemp represents 65 per cent of the exportation of the islands, and therefore when the hemp increases its effect upon wages is felt immediately.

Now, I would like to read Mr. Knapp's statement with reference to the labor in the islands. Nobody can say that when Mr. Knapp visited those island he was prejudiced in favor of the rice of the Philippine Islands. He is an expert on rice; he has deep interest in the development of rice in the State of Texas and in the State of Louisiana. He takes up one of the statements in the American Economist—that has been devoting its attentions, I believe, although I have not had the pleasure of reading its columns, to an abuse of those of us who are striving to work out the Philippine problem—and in the course of it he takes up a statement of that paper on the question of rice, which is just of a piece with the character of articles that have been circulated all over this country, and which have been sent to Ohio, Connecticut, Pennsylvania, and elsewhere, and aroused good people, aroused conscientious people, aroused people who had an interest in the cultivation of tobacco and beet sugar to an alarm that is absolutely unjustified by the fact. They have been circularized to death, and I have no doubt that every Senator and Member of Congress has received from home these statements as to the horrible condition that is going to follow the passage of this bill.

In the American Economist of July 7, 1895, I find an article on the above subject, which is at least very surprising in many of its statements. The following paragraph is a sample:

"It is possible for rice to be raised in the Philippines with cheap labor at a figure which would enable the Philippine producers to ship their rice into this country, in case the duty is removed, and dispose of it at prices which would

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be absolutely ruinous to the entire rice industry of the United States. In the Philippines labor can be secured at from 10 to 15 cents per day, while the American farmer must pay from $1.25 to $1.50 per day. The Philippines use the crude system which has been in vogue throughout the Orient for hundreds of years at practically no expense, whereas the American farmer must use up-to-date machinery—high-priced harvesters, binders, and thrashers—which increase the cost of production and the marketing of his rice to very close to the figure at which it is sold."

That is the quotation. Now Professor Knapp goes on:

In the first place, it is not true that labor in the Philippine rice fields under American rule can be obtained at 10 to 15 cents per day. Twenty to 25 cents would be nearer the general average, and with the stimulus given to general industry by freer trade relations with the United States, farm laborers would readily command from 35 to 50 cents per day. This increase of wages is based on what has occurred in Porto Rico and the Hawaiian Islands when freer trade relations were established with the United States.

All this alarm about the ruin cheap foreign labor may effect in this country rests upon the false assumption that a 20-cent laborer in the Philippines does just as much work in a day as a dollar and a half laborer in the United States. As a fact, the American at $1.50 is cheaper than the Filipino at 20 cents. It may be safely affirmed that American labor is paid the lowest wage of any laborer in the world, based on the work accomplished per day.

Then he goes on to discuss other subjects. Now I am asked, after reading from Professor Knapp, how do I meet his proposition that this is going to hurt the rice industry. I meet it in this way, by admitting that his proposition is entirely sound. Not that rice is going to be raised in the Philippines in such a way that it can be imported into this country, because we need it there, but that with the low duty on rice in the Philippines, they might afford to go over to Saigon, and to other places in that neighborhood, and import rice and eat that themselves, and send their own rice over to this country.

Now, I agree with Professor Knapp, and that is all he asks, that they shall not be allowed by that mere substitution to introduce rice into this country at a price that it can be raised at in Saigon with the lower duty added, and therefore I am entirely willing to concede, so far as my consent is of importance, that there should be inserted in this bill a clause embracing the rice imported from other countries with exactly the same duties that are imposed in the Philippines.

The CHAIRMAN. In the United States, you mean?

Secretary TAFT. In the United States; with this condition added, and that I ask to be inserted merely to protect the inhabitants in the Philippines from possible famine. In tropical countries the danger is much greater than it is in a temperate zone—the danger of the failure from the irregularities of rains and other things—unseasonable occurrences that affect crops. It is quite possible that there might be a drought, or there might be some other temporary interference with the production of rice that would make it necessary for us to lower the gates and let in rice so that the people might be fed at reasonable prices, and not be subjected to a suffering because of the exorbitant price of rice.

The condition, therefore, which I would ask to have inserted is that this duty on rice shall be imposed in the Philippines, to be reduced by the Commission whenever an emergency with respect to food arises in the islands, and in that case, in order to prevent what Professor Knapp fears, that there should be imposed on rice coming from those islands into this country just the differential. In other words, we do not ask for the Philippine Islands anything but the same treatment that everyone else has behind the tariff wall. When I say behind the tariff wall I mean with reference to those things which it is important to the Philippines should come behind the tariff wall.

I do not mean that we are to extend the Dingley bill clear around the islands, because it is necessary neither for the benefit of the United States nor those islands that it should be done; but give us the benefit of the markets for the agricultural products of those islands and then give free trade to the United States so that it may sell anything that it makes in those islands, and then with reference to the other articles upon which a revenue tariff is imposed in the Philippines, and with respect to which the United States has no interest, let them come in at the present Philippine revenue tariff. But for the purposes of the market, for the purposes of protection, put us just under the same ban and under

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the same burden as the United States producer is. That is all we ask, and give us this market. The same principle applies as to the coastwise shipping laws.

Now I come to the specific question with reference to the market for sugar, and the question is, Will this hurt the beet-sugar industry—this bill? Speaking in round numbers, for the last year, which is the last one of which we have statistics—that is, the year 1904–5, and using only round figures, the United States demand for sugar was 2,700,000 tons. The local supply, in round figures, was 1,100,000 tons, a deficit of 1,600,000 tons which was supplied by, in round figures, 1,100,000 tons from Cuba, 350,000 tons from the East Indies, 50,000 tons from the Philippines—not so much; it was about 40,000, but I put it in round numbers—and other countries about 100,000 tons.

Now, I put it as a plain economic proposition, that everybody must recognize, that the question whether the beet-sugar people are to be injured or not depends upon the price of sugar in the market in which they sell their sugar. That is the first proposition. The second proposition is that the price which will determine what that sugar sells at in that market is the price at which the most expensive sugar is brought into the market and can be sold for in the market. Now, what is the most expensive sugar? It is that which comes from the East Indies and that which comes from Cuba. That which comes from the East Indies come over the tariff wall at the entire Dingley rate. That which comes from Cuba comes over the tariff wall at 20 per cent less, and that which comes from the Philippines at 25 per cent less than the Dingley rate, and these 100,000 tons that come from other countries come over the tariff wall at the full Dingley rate.

The second proposition is, therefore, that until the production behind that tariff wall increases 1,500,000 tons the importations from the Philippine Islands can not have the slightest effect—not the slightest effect on the prices behind the tariff wall. It might have some effect in reducing incidentally and indirectly, but most slightly, the world's price of sugar, by reducing the importation from the East Indies and Cuba into the United States and causing that to seek another market. But when the world's supply is considered it will be seen that its enormous total would, as compared with any possible production and export from the Philippine Islands, make its effect negligible. It therefore follows that the burden is on these gentlemen to prove that this is going to affect them in the slightest, to show that the increase in the product of the Philippine Islands and of American beet sugar will make 1,500,000 tons. Now, is that possible?

Considering the production that we have had in the Philippine Islands in past years, even when sugar was 4, 5, 6, and 7 cents a pound, it is utterly impossible now, with sugar at its present price, under the conditions of labor which I have described. Then consider the reluctance of capitalists to invest in those islands, which Mr. Hathaway's refusal to invest there illustrates and confirms. It is a mere dream to believe that ever in the Philippine Islands we shall go beyond four or five hundred thousand tons, and that in the course of a great many years.

Now what is the cost of producing sugar in the Philippine Islands? The only relevancy, and I beg the gentlemen to understand and see it clearly, the only relevancy with reference to the cost of producing sugar in the Philippine Islands and the profits on producing it is as to whether that will furnish motive sufficient to increase the production from the exportation of 83,000 tons to an exportation of 1,500,000 tons. That is the only relevancy that it has in this discussion, because no matter what it is produced for, if it added to increase in beet sugar in this country, does not exceed a million five hundred thousand tons it won't have any effect here, no matter what profit the Philippine sugar planter makes.

Now, then, what is the price per ton? I say that, according to the great weight of the evidence before your honorable committee, it costs under the present condition 4 pesos a picul, and that reduced to pounds is about $1.50 a hundred, or a cent and a half a pound. Señor Luzuriaga is probably the best witness on that subject. He owns two plantations in Occidental Negros, and has lived there all his life. He has loaned money on sugar lands. He is a man of affairs, and I subjected him to a cross-examination at a time when this question was not rife, just after we went back to the Philippines in 1902. I did it for the purpose of finding out the value of the sugar lands of the friars. He said that sugar land of the first class was worth from $20 to $30 an acre in Occidental Negros. His figure that the cost of sugar to the farmer was 4 pesos a picul laid down in Iloilo does not take into consideration the profit

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of the farmer or the rental value of his land. It does not take into consideration the interest he has to pay on the loan, which is enormous, but it is only the cost with reference to the matter of labor—to the actual money consumed in the production of sugar. Mr. Welborn says the same thing. Mr. De la Rama says the same thing.

Now, on the other hand, we have the statement of Mr. Hathaway, who says it costs the Filipino farmer only 75 cents a hundred to lay sugar down in Iloilo. He says it will cost 24 cents to carry it to New York, so that means that without duty it can be laid down in New York at just about a cent a pound. If sugar can now be produced at a cent a pound, there is certainly no reason why in the past it should not have been produced at even less, for the coming into the islands of the Americans has certainly increased the wage, and everybody admits it.

Let us take Mr. Hathaway's assumption that you can produce sugar and lay it down in New York at a cent a pound. If so, the sugar planters and producers in the Philippine Islands, by shipping sugar to New York, in 1898 could have made a profit of 44 per cent at prices then prevailing. In 1899 they could have made a profit of 52 per cent; in 1900 they could have made a profit of 54 per cent, and in 1901 they could have made a profit of 36 per cent, and this profit would have been with the full Dingley rates imposed.

From 1902 to 1905 they would have made, at the prices then prevailing in New York, a profit of 41 per cent, and in 1903 a profit of 59 per cent, and in 1904 a profit of 64 per cent.

The profits above stated, on the theory that sugar can be laid down in Iloilo at 75 cents a hundred and carried to New York and laid down in New York, freight, commission, and insurance paid, for 24 cents, or in all, 99 cents a hundred, as stated by Mr. Hathaway, is shown by the following calculation:

	Per hundred.
Cost of laying down sugar in Iloilo	$0.75
Commission, insurance, and freight to New York	.24
Duty on sugar polarizing at 84°	1.25
Total	2.24

The price of sugar obtaining in the New York market for the year 1898 for sugar polarizing at 96° was $4.23 a hundred. The sugar polarizing at 84° is worth just $1 less a hundred, so that the price of 84° sugar in 1898 was $3.23. In 1899 it was $3.41; in 1900 it was $3.56; in 1901 it was $3.04, and in 1902 it was $2.54.

In 1902 the tariff was reduced by 25 per cent. If Mr. Hathaway's figures are correct as to the cost of sugar in the Philippines, the cost of laying it down in New York since 1902 would have been as follows:

	Per hundred.
The cost of laying down in Iloilo	$0.75
Freight, insurance, and commission to New York	.24
Duty on 84° sugar	.94
Total	1.93

The price of 84° sugar in New York in 1903 was $2.72 a hundred; in 1904 it was $2.97 a hundred, and in 1905 it was $3.28 a hundred, wtih the profits which I have above stated.

Now, let us take the importations of sugar from the Philippines and see the effect of such large profit on their amount. In 1898 they sent over 28,000 tons; in 1899, 21,000 tons; in 1900, 2,000 tons; in 1901, 5,000 tons; in 1902, when they might have made a profit of 41 per cent, they sent 5,000 tons; in 1903, 29,000 tons; in 1904, 25,000 tons, and in 1905, 43,000 tons, and that is what Smith, Bell & Co. have made such a tremendous loss on, yet we are told that we can make sugar in the Philippines and lay it down in New York at 1 cent a pound. Do not these comparatively small importations show the utter lack of foundation for the claim that sugar can be laid down in Iloilo for 75 cents a hundred and in New York for a dollar?

Why, the price in Iloilo is a cent and thirty-nine one-hundredths a pound, or was very recently, and it has generally been higher than that. According to Hathaway's figures this would give a profit to the farmer of 64 cents a hundred, or a profit of 85 per cent. This, of course, ought to make the sugar-growing industry on the islands most profitable. But is it so? Gentlemen, "The

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proof of the pudding is in the eating." Call any witness and ask him whether that industry is in anything but a most disastrous condition.

Governor-General Wright was here and told you that the bankers have declined to loan any money on sugar estates, so bad is their condition. It is said that Mr. Yulo was making $200,000 a year on his estate. We examined Mr. Yulo. His statement as to the profitable character of his business was very different. Why is it that Mr. Lacson, one of the planters in the Philippine Islands—upon whose estate I have been, and a very fair estate it is, beautiful to see—why is it that he has gone so much out of sugar and into rice? It is because at the price prevailing at Iloilo, from $1.25 to $1.39 and $1.50 they can not raise sugar and live. So I say that Mr. Hathaway's investigation, kept in a diary, in which he had conversations with all sorts of people, constabulary officers and everybody else, and in which he gave the impression that he was there for the purpose of buying land, are utterly unreliable.

Now, Mr. Gove, with whom I became acquainted in the Philippines, when he told me he was out there in the beet-sugar interests to make investigations, and had been around with Mr. Hathaway, says that the Filipino people are poetic as witnesses. I agree that they are, and I agree that their imagination runs very rapidly when they are on the side of the bargain that assists in securing them a good price, and that therefore you are to weigh their evidence given in this case by making proper allowance for their interest in having this bill passed, and on the other hand, when you weigh what Mr. Hathaway reports as having heard from them when he represented that he was there to buy their land, you must make allowances for their desire to get a good price for the land.

Mr. Gove had a benevolent interest in the schools. He was also there to assist Mr. Hathaway. Well, it seemed to me last summer when in Manila that when we were on the ground we ought to examine all the witnesses possible who could throw any light on the subject and assist the visiting Senators and Congressmen. I suggested that Mr. Gove, who was present at the Manila hearings, listening to the evidence, should come forward and testify so that we might find out what his conclusions were and call other witnesses to make the conclusions more satisfactory. But Mr. Gove said that he was not able then to testify. "The truth is," he said, "I have not reached any conclusion; I have not got my data together in such a way as will enable me to testify."

Now, he had been about three months in the island, and it seemed to me that if he had discovered anything valuable by that time he might have made up his mind as to something and to have stated the conclusions. But he did not do so, and now he comes before us to tell us what the price of labor is, or rather what the cost of making sugar is in the islands. I submit that he would have made his evidence very much more weighty if he had frankly gone on the stand there at that time and told us the results of his investigations, instead of waiting until his companion, Mr. Hathaway, and he should confer and finally reach a result.

Now with respect to Mr. Hathaway, he was ill when we were in the islands the first time, but if he had been exceedingly anxious to have us know what his conclusions were, and investigate them, he might have communicated with the committee, or waited until the committee returned to Manila, but by that time he had left. He says he did suggest that we call one witness, Mr. Rothrock. We did not know of Mr. Rothrock's importance until we reached Bacolod, and he was not there, though that was his home.

Now, from Mr. Rothrock I have an affidavit, taken since, which I desire to read. It is an affidavit certified to be a true copy by the chief clerk of the bureau of agriculture, and is signed "P. O. Rothrock." It was taken by a notary public, Ricardo Nolan. The affidavit is as follows:

PHILIPPINE ISLANDS, *Province of Negros Occidental, ss:*

"P. O. Rothrock, being first duly sworn, deposes and says that he is a natural-born citizen of the United States of America, and a practicing lawyer, with offices at Iloilo and Bacolod, P. I.; that some six months ago a gentleman by the name of Hathaway came to his office in Iloilo, stating that he had come to the Philippine Islands for the purpose of investigating the sugar industry with a view of establishing a sugar central if he should find conditions favorable, and that within a few days he and his traveling companion, a Mr. Gove, intended going to the island of Negros. That as affiant had sugar lands on said island it was agreed that affiant should accompany the said gentlemen on their said trip of investigation; that affiant did so accompany them from

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Iloilo to Silay, Talisay, and to Bacolod, and at times acted as interpreter in their talks with farmers on said island of Negros, neither of the said gentlemen being versed in nor understanding the Spanish language. That the said Hathaway in said conversations with the said farmers about the sugar industry stated that he represented capital, and that if he could procure lands and other favorable conditions, that they would put in a central. That in such investigations the said Hathaway, after stating his object, would ask at what price he could purchase land and how much, at what cost cane could be raised, if he could buy land, what it cost them to raise cane, and if in their opinion if he did erect a sugar mill the owners of land could and would furnish him with cane to mill.

"That affiant believes that the said Hathaway purposely led all such persons to believe that if they could convince him that a profit could be made he would at once make large investments, and that in many instances the cost of production was understood to mean the cost of labor alone to the farmers in their answers to the said Hathaway. That affiant had planned to continue his trip with the said Hathaway to the south of Bacolod, but became convinced by the time Bacolod was reached that said Hathaway's only object in making his "investigation" was to elicit a statement of how cheaply sugar could be produced, as he eliminated all matters except actual cost of raising the cane and a few questions at times as to grinding, and of how many rattoon crops could be raised under most favorable conditions. Upon being convinced that his only object was to get these statements and not to make any real investigation of the subject, affiant excused himself from going further with the said Hathaway. That in making the said trip the said Hathaway was assisted in every possible way by everyone, as being an investor who in all probability would help to solve and better the sugar problems of the island; that he had letters to leading officials here and to several large farmers from members of the Civil Service Commission, asking that all aid and assistance be given him in his said "investigations." And further affiant sayeth not."

"P. O. ROTHROCK."

"Subscribed and sworn to before me this 19th day of November, A. D. 1905. Affiant exhibited to me his certificate of registration, No. 319646, issued in Iloilo, P. I., January 6, 1905.

"R. NOLAN, *Notary Public.*

"A true copy.

"SETH BOHMANSON,
"*Chief Clerk Bureau of Agriculture.*"

Now, I submit that under those circumstances the evidence which Mr. Hathawas obtained was subject to great variation and great exaggeration. I believe Mr. Hathaway said he did not say to everyone that he was looking about to buy land, but it is immaterial whether he said it to everyone or whether he gave the impression to only a few, because that was enough to have it understood at once that a great American capitalist was there. Among an ignorant people like that, knowledge of the mission of a stranger passes from one locality to another so quickly that it seems almost as if they had telegraphic communication.

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[From Report of the Philippine Commission, 1905, vol. 3, p. 122.]

TOBACCO INDUSTRY.

The following table shows the tobacco exported from the port of Manila during the first six months of the year 1905, by grades, and gives the average price per pound of each of the grades:

TOBACCO EXPORTED FIRST SIX MONTHS 1905.

	Duty per 100 kilos.	Pounds.	Value.	Duty.	Average price per pound.
Tobacco grown in the provinces of Cagayan, Isabela, and Nueva Vizcaya, Luzon	$1.50	3,211,549	$295,551.40	$21,896.98	$0.092
Tobacco grown in the Visayas and Mindanao Island	1.00	122,688	6,096.85	557.67	.049
Tobacco grown in other provinces	.75	1,545,260	69,936.47	5,267.95	.045
Total	--------	4,879,497	371,584.72	27,722.60	.076

TOBACCO EXPORTED DURING JULY, 1905.

	Duty per 100 kilos.	Pounds.	Values.	Duty.	Average price per pound.
Tobacco grown in the provinces of Cagayan, Isabela, and Nueva Vizcaya, Luzon	$1.50	1,229,349	$101,616.25	$8,881.95	$0.082
Tobacco grown in the Visayas and Mindanao Island	1.00	236,603	11,760.00	1,075.74	.049
Tobacco grown in other provinces	.75	2,410,348	114,420.74	8,217.10	.047
Total	--------	3,876,360	227,796.99	17,673.79	.058

NOTE.—Prior to January 1, 1905, no statistical record was kept of the relative quantities of the different grades of unmanufactured tobacco.

CIGARS AND CIGARETTES EXPORTED ON PERMITS.

In addition to the quantity of manufactured tobacco regularly exported, as shown by export entries and reported as exports, considerable quantities of cigars and cigarettes have been taken on board vessels destined for foreign ports upon permits upon which a fee of ₱0.50 per thousand for cigarettes and ₱1 per thousand for cigars has been charged.

During the past five months a statistical record of cigars and cigarettes so sent has been kept, from which it is shown that during the said period 276,684 cigarettes and 787,872 cigars have been exported from this port of Manila in this way.

Assuming that for the previous seven months the quantity thus exported was approximately in same proportion, the quantity exported during the fiscal year would be 663,970 cigarettes and 1,890,893 cigars, the aggregate market value of which would be approximately $20,128 United States currency.

The monthly average of cigars thus sent is about 150,000 and of cigarettes about 50,000.

In addition to the foregoing, a great many cigars and cigarettes are taken on board of outgoing vessels in small quantities for personal use of passengers, and also a great many are sent in small quantities by mail which do not appear on customs records.

Generally the cigars and cigarettes taken on board in this manner are of better grade and higher market value than the average of cigars and cigarettes regularly exported, as shown by export entries.

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TOBACCO PRODUCTS.

Leaf tobacco.—No tax is imposed in the internal-revenue law on the manufacture of cigars, cigarettes, or smoking or chewing tobacco by the consumer for his own use. With the exception of the one-third of 1 per cent imposed in section 139 on the value of sales made by merchants, traffic in leaf tobacco is free in these islands. Wholesale dealers in leaf tobacco, however, are required by this office to keep a record of all sales made to manufacturers of cigars, cigarettes, and smoking or chewing tobacco. In the provinces of Cagayan and Isabela is produced the only tobacco fit for use in the manufacture of the better quality of cigars and cigarettes. In the provinces of La Union, Ilocos Norte and Sur, Batangas, in two or three of the Visayan group of islands and in Mindanao, tobacco leaf is produced to a limited extent, but it has the reputation of being of an inferior quality. Except for limited local consumption by the persons raising it or for the purposes of blending it with the better leaf there is no demand for the tobacco raised outside of the provinces of Cagayan and Isabela. The Spanish Government had a monopoly, which lasted one hundred years, in the manufacture of all leaf tobacco produced in these islands. The Government supervision over the planting, curing, and sorting of the leaf was absolute and the quality of the tobacco was improved and the quantity increased by such supervision. In 1882 the Government monopoly was abolished and the planting and manufacture of tobacco became free for all. Since then the quality of the leaf produced in Cagayan and Isabela has constantly deteriorated from season to season. No sufficient preparation of the soil, no care in the selection of the seed, of the method of planting, or of the growing leaf, crude methods in curing the leaf, and dishonest practices of middlemen in sorting it for sale have all contributed to discredit the former fair fame of Philippine tobacco, both abroad and at home. A constantly increasing number of smokers in these islands are discarding the domestic cigar and cigarette and are smoking cigars imported from Sumatra and elsewhere, imported Chinese smoking tobacco, and even cigarette and pipe tobacco from the United States. On May 18, 1905, some of the leading cigar and cigarette manufacturers of Manila entered into an agreement having for its object an increase in the production and improvement in the quality of the tobacco leaf in Cagayan and Isabela, as well as to secure, if possible, more uniformity in the sorting of the leaf by middlemen. Little effective work, however, has as yet been done along these lines. Meanwhile the quality of the leaf continues to deteriorate and the local manufacturers find it an increasingly difficult task to supply demands for domestic consumption. The largest wholesale and retail dealer in Manila of cigars and cigarettes, who is also the authorized distributer for all of the leading cigar and cigarette manufactories, has just issued a pamphlet to the trade entitled "The Cigar Question." From this pamphlet the following is quoted:

"The demand for Philippine cigars and cigarettes has during the past two years exceeded the output, causing long and vexatious delays in filling orders."

Several of the larger cigar and cigarette manufactories are now running at full capacity an extraordinary number of hours each day, and when good leaf is not available they use the best they can get, which is, in many cases, poor enough. Under the caption "Cigars," below, are given the figures on cigars manufactured and removed for domestic consumption, tax paid, and for export, exempt from tax, during the year ended July 31, 1905. What the Manila cigar manufacturers will do with the United States market, assuming that they get it, is now the puzzle. Even though immediate and effective measures were provided to increase the amount of good quality leaf such as would be required to make cigars suited to the American taste, it would be several years before such measures would produce results and properly seasoned leaf would be available.

In Appendixes L to T and in Tables 1, 2, and 4 of Appendix W to this report will be found further data regarding the present status of the production of leaf tobacco, of the methods employed in the manufacture of cigars, cigarettes, and smoking tobacco, itemized statement of tax collections, etc.

Manufactured tobacco, smoking and chewing.—Section 101 of Act No. 1189 imposes a tax of 48 centavos on each kilogram of smoking or chewing tobacco of all kinds manufactured in the Philippine Islands for domestic sale or consumption. During the eleven months ended June 30, 1905, taxes were collected on smoking and chewing tobacco amounting to ₱84,439.55; during July, 1905, ₱8,435.64; total for the year ₱92,875.19. This represents a total output consumed in the

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Philippine Islands of 193,490 kilograms. In addition, there was manufactured and exported during the year from these islands smoking tobacco (chopped tobacco, called "picadura") as follows:

	Kilograms.
To Spain	7,949
To Straits Settlements	2,814
To England	2,320
To China	1,958
To Japan	3
Total	15,044

Exported manufactured tobacco is not subject to the internal-revenue tax imposed in section 101. Added to the tax-paid tobacco this gives a total annual output from the factories in these islands for domestic consumption and for export of 208,534 kilograms of smoking and chewing tobacco. Considerable quantities of leaf tobacco are cut in one manufactory to be taken to another for conversion into cigarettes. As the tax on this tobacco is subsequently collected on the cigarettes no account is taken in the figures given above of the tobacco so handled. Of the tax collected on manufactured tobacco 84 per cent is paid in Manila and 16 per cent in the provinces. There is no snuff manufactured in the Philippine Islands. The chewing tobacco is used by the lower class of natives; they chew it mixed with betel nut.

Cigars.—Section 107 of Act No. 1189 imposes a tax ₱2 on each 1,000 cigars worth 20 pesos or less per thousand, ₱4 when worth over 20 and not over 50 pesos, and ₱6 when worth over 50 pesos. The tax is assessed on the manufacturer's wholesale price on cigars removed for domestic sale or consumption. During the eleven months ended June 30, 1905, taxes were collected on cigars amounting to ₱145,996.81; during July, 1905, ₱14,740.53; total for the year, ₱160,737.34. Of this total 90.5 per cent was paid in Manila and 9.5 per cent in the provinces. This represents an output of cigars consumed in the Philippine Islands, by classes, as follows: Worth ₱20 or less per M, 60,276,450; worth over ₱20 but not over ₱50 per M, 8,036,890; worth over ₱50 per M, 1,339,480: total, 69,652,820 cigars. In addition there were manufactured and exported during the year from these islands cigars, by classes, as follows:

Exportation of cigars, August 1, 1904, to July 31, 1905.

To—	Worth per M.			Total.
	₱20 or less.	Over ₱20, but less than ₱50.	Over ₱50.	
China	39,770,418	9,301,097	664,145	49,735,660
Straits Settlements	3,971,960	3,816,518	69,343	7,857,821
Australia	3,487,406	2,381,118	191,284	6,059,808
England	3,227,912	1,941,349	89,322	5,258,583
Spain	2,350,500	648,900	230,770	3,230,170
India	947,370	661,361	170,883	1,779,614
France	1,838,500	36,000	500	1,875,000
South America	631,007	115,474	5,656	752,137
Germany	349,410	351,681	45,966	747,007
Japan	194,857	362,207	27,663	584,727
Indo-China	72,039	423,054	7,817	502,910
Java	344,494	122,416	9,257	476,167
South Africa	182,337	207,316	65,738	455,391
Italy	51,030	221,524	1,016	273,570
United States	54,371	71,561	41,761	167,693
Hawaiian Islands	64,000	77,000	3,500	144,500
New Zealand	28,719	58,851	44,146	131,716
Canada	24,077	91,146	930	116,153
Switzerland	34,750	40,300	7,125	82,175
Holland	53,000	2,000	----------	55,000
Egypt	8,200	33,000	1,850	43,050
Belgium	15,000	10,500	----------	25,500
Scotland	7,000	5,700	7,000	19,700
Korea	7,799	6,408	2,089	16,296
Persia	5,000	----------	----------	5,000
Consumed on high seas	216,178	500,384	146,220	862,782
Total	57,937,334	21,486,815	1,833,981	81,258,130

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China is the best customer, taking about 60 per cent of all of the cigars exported from these islands. But much the larger portion of the cigars exported to China are of the very inferior grades; they are really large cigarettes wrapped, paper and all, in a strip of leaf tobacco, and are classed as "cigars" through courtesy and for the lack of a better name.

The total output of cigars from all of the manufactories in these islands during the year ended July 31, 1905, was as follows: For domestic consumption, 69,652,820; for export, 81,258,130; total, 150,910,950. The normal annual consumption of cigars in the United States is 7,000,000,000. If it were possible to divert every cigar made in these islands to the United States the home producers in that country would still have to supply about 98 per cent of the cigars consumed there. Inasmuch as the bulk of the cigars produced in these islands could not be sold in the American market at any price, it is believed, even though the Philippine cigar was admitted customs duty free into the United States, that the cigar manufacturers in that country would, for a long time to come, retain considerably over 99 per cent of their present trade.

Cigarettes.—Section 107 of Act No. 1189 imposes a tax of 67 centavos on each 1,000 cigarettes weighing 2 kilograms or less per thousand, and a tax of ₱2 on each 1,000 cigarettes weighing more than 2 kilograms per thousand. During the eleven months ended June 30, 1905, taxes were collected on cigarettes amounting to ₱1,812,141.05; during July, 1905, ₱183,990.52; total for the year, ₱1,996,131.57. Of this total 96.2 per cent was paid in Manila and 3.8 per cent in the provinces. This represents an output of cigarettes consumed in the Philippine Islands, by classes, as follows: Weighing 2 kilograms or less per thousand, 2,956,956,090; weighing more than 2 kilograms per thousand, 7,485,500; total, 2,964,441,590 cigarettes. In addition there were manufactured and exported during the year from these islands cigarettes, by classes, as follows:

Exportation of cigarettes, August 1, 1904, to July 31, 1905.

To—	Weighing per M.		Total.
	2 kilograms or less.	More than 2 kilograms.	
China	8,525,855	398,800	8,924,655
Spain	1,229,325	2,000	1,231,325
France	1,040,000	----------	1,040,000
Switzerland	721,190	100,240	821,430
England	697,050	144	697,194
Straits Settlements	648,690	18,300	666,990
India	497,120	14,700	511,820
Australia	250,280	13,248	263,528
America	185,316	6,600	191,916
Guam	156,700	3,000	159,700
Japan	107,720	6,096	113,816
Java	27,785	----------	27,785
Canada	14,765	----------	14,765
Consumed on high seas	234,941	10,400	245,341
Total	14,336,737	573,528	14,910,265

The total output of cigarettes from all of the manufactories in these islands during the year ended July 31, 1905, was as follows: For domestic consumption, 2,964,441,590; for export, 14,910,265; total, 2,979,351,855 cigarettes. The Manila and provincial markets were largely overstocked with cigarettes removed from the manufactories prior to August 1, 1904, to escape the tax which accrued on that date. As a result the cigarette market was quite dull during the last five months of 1904; but beginning with the month of January, 1905, and continuing up to the date of making this report the volume of cigarettes removed from the manufactories, taken as a whole, has attained normal dimensions. The tax rate imposed on cigarettes in these islands is but one-third of the rate imposed in Porto Rico and less than one-third of the rate imposed in the United States. As a revenue producer the tax on cigarettes leads all others. Cigarettes weighing more than 2 kilograms per thousand and paying at the ₱2 rate constitute but a very small percentage of the total cigarettes consumed. As the internal-revenue law now stands, cigarettes now subject to the 67-centavo rate per thousand will, on and after January 1, 1906, be subject to tax at the rate of ₱1 per thousand. Even at this increased rate the tax rate in these islands will only be one-half of what it is in Porto Rico and less than one-half of what it

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is in the United States, and consumers in these islands will continue to get two or three times as many tax-paid cigarettes for their money as they can get in the United States or in Porto Rico. It is recommended that the existing provisions of act No. 1189 taxing cigarettes remain unaltered.

Distribution of cigar and cigarette manufactories.—The cigar and cigarette manufactories in the provinces are few in number and relatively of little importance. The Manila manufactories control almost in its entirety the provincial trade. The poorer classes roll their own cigars or buy or raise their own leaf tobacco, chop it, and roll all of the cigarettes they consume. They did this before the internal-revenue tax was imposed and thus saved an amount equal to the manufacturers' profit. They still continue to do this and save an additional amount equal to the tax on the manufactured tobacco, cigars, or cigarettes they consume. In Manila there are 58 manufactories where cigars are made and 50 manufactories where cigarettes are made. The cigars are made exclusively by hand; one of the larger manufacturers imported sometime since two cigar machines of European make for experimental purposes, but the tests were unsatisfactory and the machines were discarded. Most of the cigarettes are machine made, all but seven of the manufactories having their own machines. In some of the larger manufactories special brands of handmade cigarettes are turned out. The usual number of cigarettes to a box is 30, but a considerable number are put up in packages of 24 and even less. The girls in the manufactories are quite expert, and will unerringly and almost automatically lift from a pile of cigarettes the exact number needed to fill the boxes they are packing. Twenty-four Filipinos, 19 Chinamen, 14 Europeans, and 1 American negro are engaged in the manufacture of cigars, and 25 Chinamen, 14 Filipinos, and 11 Europeans are engaged in the manufacture of cigarettes.

[Same Report, page 203.]

APPENDIX L.

OUR AGRICULTURAL RESOURCES.

[Editorial from La Voz del Pueblo, of Tuguegarao, Cagayan, June 22, 1905, on the production of tobacco in that province.]

Under this title we include our only agricultural product with which our brothers in the field provide for their necessities. It is in the development of this product that their future lies. We call the attention of our agricultural brothers to the discredit in which tobacco leaf is held, in an increasing scale, in the Manila market.

Our object in taking up this question is only to illustrate to the thinking people of the province and the valley of the Cagayan the fundamental reasons that have caused the depreciation of tobacco leaf and the remedies necessary to cure the evil.

The existing prostration of the tobacco industry is primarily due to the laziness and bad faith of the agriculturist. Our extreme laziness, due to the enervating climate of these latitudes and encouraged by the fertility of our soil, has been exaggerated by the absence of official intervention and encouragement since the time when the tobacco monopoly by the Government was abandoned. The demand for tobacco increased, when its cultivation became free to all, until it reached its highest mark in the year 1900, when the agriculturists mortgaged their crops at fabulous prices and did not attempt to duly season the leaf nor properly prepare the soil; this resulted in the practice existing to this day among the large majority of our agriculturists—to raise large crops with a minimum of labor. It is evidently believed that a large quantity of leaf will make up for poor quality. The sophistry of this method of reasoning should be made apparent, and the endeavor should be made to produce smaller crops but of better quality.

Our bad faith has become noticeable in the mixing of different grades of tobacco in the same packages, all of which is due to our greed after lucre. We do not seem to understand that by this procedure we destroy the main fountain from which our agricultural wealth springs.

These, then, are the two prime causes of the present unsatisfactory condition of the tobacco culture, and we shall now proceed to enumerate the methods which, in our opinion, should be followed by the producer in order to avoid the menace now before us of the total annihilation of the main source of wealth of the valley of Cagayán.

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If the human family requires in its raising the utmost care in order that it may be brought to a healthy maturity it is no less the fact that the nurseries for the production of the tobacco seedlings should receive the same careful attention. Soil of the proper richness should be selected, preferably virgin soil from which the forest growth has recently been removed, and if such soil is not available, then the soil used for the nurseries should be properly pulverized and fertilized. The matter of watering or irrigating these beds should also receive careful attention until the seed has generated. The transporting of the seedlings should be made at a time when the first two leaves have grown to about the size of a peso.

If in the conservation of animal life proper hygiene is necessary it is also necessary for the proper nutrition and development of vegetable life. For the care of the growing plants it is necessary that the ground should be properly prepared. The soil should be plowed three or four times in order to break up the clods and permit the roots of the tobacco plants to penetrate and absorb the necessary nutritive matter therefrom. The soil should be properly fertilized. The worms and other insects and the weeds that grow up in the plantation should all be eradicated. The plants should be watered or irrigated in such a manner as to not wet the leaves (this in case of drought). The buds should be picked off in order that the sap, which would otherwise go to waste, may be used to increase the size and quality of the leaves. All young shoots that do not promise to produce good leaves should be removed.

After all foresight has been used for the care of the growing plant careful attention should be devoted to the gathering of the leaves. This should be done at the proper stage of their development, neither when they are too green nor after they have passed the proper stage.

If the agriculturist takes pride in the appearance of a plantation properly cultivated he should also take the same pride in seeing that the harvest from his fields is properly cared for and seasoned before it is delivered to the purchaser. Tobacco leaf should be cured under roof, in order that the changes in the weather may not affect its quality. To-day tobacco leaf is largely seasoned in the open air and the rain and hot sun prevent the proper curing, which can only be obtained in an equable temperature. Care should be taken also in the cutting of leaves which go to make up a manojo (package); in the conscientious selection of the leaves of the various grades in order that they may be properly classified and delivered and, in this manner, to rewin confidence on the part of the purchaser in our good faith; in the proper handling and pressing of the leaf in order that the delicate fiber may not be injured; in patient and intelligent stacking of the leaves in order that the curing may be uniform and perfect and that a uniform temperature may be obtained, otherwise the leaf will ferment and spoil. In the stacking of the tobacco leaves a vent should be left in the center of each stack in order that the vapors from the sweating of the leaves may have an opportunity to escape, and in order that the noxious gases may be eliminated and that the aroma and proper coloring of the leaf may be obtained. In the handling of the tobacco the various bundles and packages should be turned and distributed so that each may alternately occupy an exterior and an interior position in the stack.

With regard to the use of fertilizers of the soil it has been found in practice that the best result will be obtained by their use. We have seen that the valley lands, which are periodically watered by the Rio Grande, from which this province takes its name, produce a superior crop. It is therefore recommended that sufficient fertilizers be used on the higher lands devoted to the culture of tobacco and to which the alluvium from the river can not be carried even at the high stages of water.

The foregoing remedies which we have prescribed to bring about a better condition in our agricultural industry, now so depressed, are more in the nature of reminders, for the reason that the agriculturists of this valley are already well aware of their duties in the premises. We therefore remind our brothers in the fields that if, before the time when the Government monopoly on tobacco lands was removed, they worked because of the fear of the overseer's whip they should to-day work under the influence of the fear that if they do not do so there will be no purchasers for their product.

We conclude these few lines earnestly advising the agriculturists of this valley that they endeavor to apply the remedies we have printed and that by doing so they will, to the extent that in them lies, have assisted in raising our principal source of agricultural wealth from out of its present slough of despond.

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APPENDIX M.

CAGAYAN AND ISABELA TOBACCO LANDS.

[By H. B. Fernald.]

I. TOBACCO LANDS.

The cultivable area is roughly shown by the attached map[a] and will be seen to consist of a strip of about 5 to 10 miles in width along the Cagayán River and its tributaries. Tobacco can be grown as far north as Gattaran, but it is not of the best quality. The lands from Tuguegarao to Alcalá used to raise a first-grade tobacco, but they have been worked so continuously that the best tobacco is now found in the more recently developed lands.

There are two main factors which determine the availability of land. (1) The natural conditions, and (2) the means of transportation.

(1) *The natural conditions.*—During the rainy season, from September to December, the Cagayán River and its tributaries rise from 10 to 40 feet, covering the valleys for miles on either side with their muddy waters, which leave a deposit sometimes of several inches of silt. This makes the first-class tobacco land. Back of this is the second-class tobacco land, which is not inundated and which is practically uncultivated. These lands could in many cases, with but slight expenditure of capital, be easily flooded from some of the many small streams found throughout the country.

(2) *Means of transportation.*—For lack of fitting transportation facilities great sections of the finest tobacco lands are uncultivated, especially the Magat Valley and the upper Cagayán above Echagüe. From December to June only rarely can steamers of 3 feet draft go above Alcalá. From July to January they can usually reach Tuguegarao. From September to December they can usually reach Ilagan and sometimes Cauayan. There are two steamers, the *Magat* and *Magapic*, belonging to the Tabacalera Company, which handle only company's freight; one, the *Aparri*, belonging to a private company, which does a general business; the government steamer *Sentinel*, and three small launches. Practically all the tobacco transportation is therefore by cascoes. Probably three-fourths of the tobacco business is in the hands of the Tabacalera Company. They have their storehouses in every town. The tobacco stored in these is loaded in cascoes, which are poled, rowed, or sailed down the river until they can be taken in tow by one of the steamers and go to Lalloc for transshipment. Other cascoes go all the way to Aparri unaided. Two weeks for the trip from Aparri to Ilagan and a week for the return is quick time for a casco. The cascoes continually go aground on the numerous sand bars and often have to be unloaded before they can cross a bar. The cost of such transportation, added to the heavy rates charged by the coast steamers, make the expense of shipment equal to 25 per cent to 50 per cent of the value of the product shipped.

In addition to this expense of river shipment must be noted the cost of cartage from the fields to the river. There are practically no improved roads in the valley, and 10 miles is about the limit for profitable cartage. This is the reason that such large tracts on the upper Cagayán, on the Magat, and on many other smaller rivers are uncultivated. Many of these rivers are great torrents in the wet season, overflowing miles of fertile ground, but in the dry season are small streams, which do not serve even for rafting the tobacco to the main river.

The larger part of the land is owned by local owners in small parcels, but there are a number of large estates, especially in Isabela Province. These estates are worked by "colonistas," each of whom has his own parcel of land to work.

Few persons have valid titles to their land, and it is a common practice to settle on any suitable unclaimed land and cultivate it.

II. THE METHOD OF CULTIVATION.

In the latter part of November or early in December the tobacco is sown in seed beds, and as soon as the fields become dry enough to be worked the plants are transplanted to the fields, which have been plowed twice or thrice with the ordinary plow, harrowed with a bamboo harrow, and marked off in squares. The weeding is done twice by hand and the weeds left lying between the rows. A plow is sometimes run down between the rows. The suckers are

[a] On file in the Bureau of Insular Affairs, War Department.

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not picked off. The plants are budded once. Sometimes the leaves are picked one by one as they ripen, but oftener the whole stalk is cut at once. The leaves are stuck on sticks about a yard long and the diameter of a pencil, and put in the sun to dry. When dry, they are piled in the houses and changed occasionally as the bottom of the pile grows too hot. Before being sold the leaves are taken from the "palillos" and made into "manos" or flat packages. "Sweating" is usually done by the buyers before shipment to Manila, and again in Manila much more thoroughly.

III. IMPROVEMENTS NEEDED.

(1) *Transportation.*—The great need is for a railroad. The route suggested is shown on the accompanying map.[a] Of necessity the railroad would have to go some distance from the river and would on this account pass through much land not now available. It would also so reduce freight rates that tobacco could be carted longer distances. It would further mean that large numbers of settlers from the overpopulated provinces around Manila would come into the valley and take land not now cultivated. Such a road would not probably pay expenses for the first few years, unless the timber trade should enable it to do so, but the general increase in production and prosperity which would rapidly come would make it a paying enterprise thereafter. In bringing the valley into closer touch with Manila markets and with the civilization of the outside world the railroad will do an invaluable work.

(2) *Cultivation and care of the tobacco.*—The value of the tobacco crop of Cagayán and Isabela is much less than it would be if more scientific and careful methods were followed in planting, cultivating, and curing the tobacco. Some of the principal defects are as follows:

(a) The seed has been unchanged for years and has greatly degenerated. The importation of fresh seed from Sumatra, Cuba, and America would be a material gain.

(b) The preparation of the soil is very imperfect and expensive. Modern implements would prepare the soil better at a smaller cost.

(c) The suckers are not removed, but are allowed to grow in order to get a greater number of leaves. The buds are only removed once, and then allowed to grow again without removal. In this way a large part of the strength of the plant goes to suckers and buds.

(d) Nothing has been attempted in the way of raising tobacco under screens.

(e) When picked the leaves are jabbed on sticks, which makes a considerable hole as compared with the method of using small strings, as in Sumatra.

(f) In drying, the leaves are exposed to the hot sun. They should be first dried in darkness and then the light gradually admitted. This is probably the greatest defect in their tobacco culture and permanently injures the tobacco produced. Instead of being dried out, the oils are burned in. No process of sweating can afterwards remedy this.

IV. TO IMPROVE THE SITUATION.

(1) *Tariff reduction.*—The benefits to accrue are self-evident. Not only would those now raising tobacco receive a better price for their tobacco, but new capital would enter the valley, with improved methods of cultivation and transportation resulting.

(2) *Railroad.*—If the Cooper bill becomes a law, there can be but little doubt that a railroad will be built passing through the timber lands of the Caraballo Sur and the tobacco lands of the Cagayán Valley. The road would soon become a paying investment and the benefit to the country would be immeasurable.

(3) *River improvement.*—If the river could be dredged or in some other way the sand bars obstructing the channel could be cleared, it would reduce the cost of river transportation by almost one-half.

(4) *Coolie labor.*—Were the introduction of coolie labor to be permitted it would mean the establishment of large, rich haciendas, a great increase in the quantity and an immense improvement in the quality of the tobacco produced, and a vast increase in the general wealth of the country, but the Filipino labor would not be able to keep the pace thus set and would be driven to the wall.

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[a] On file in the Bureau of Insular Affairs, War Department.

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(5) *Education.*—The present school at Teguegarao is the beginning of a valuable work whose influence will gradually effect some improvement. There is an old Spanish Government farm at Ilagan which might be reestablished with profit and would prove a valuable object lesson in improved methods.

(6) *Fairs.*—As an immediate means of arousing an interest in improved methods of agriculture nothing would accomplish so much as the old-style "county fair." Improved agricultural implements would be brought directly to the attention of the people. The bureau of agriculture could have tobacco in various stages of cultivation, showing what approved methods will do. An object lesson of this kind would be of incalculable value. Abundant land could be obtained at Tuguegarao and thousands of people from all through the valley would attend. The usual prizes should be given for local products, and everything would be run along the line of the "county fair" in the States. One or two thousand pesos would cover the cost of the necessary buildings, and the good immediately resulting would be measured by tens and hundreds of thousands of pesos in the increased value of the crop raised.

APPENDIX N.

THE TOBACCO INDUSTRY IN THE PHILIPPINES.

[Article by Mr. B. Ayesa in El Mercantil, of Manila, April and May, 1905.]

The Hon. Mr. Taft, at a meeting of American tobacco growers, made the assertion that the only tobacco worthy of mention in the Philippines was that produced in the Cagayan Valley.

Mr. Taft knows perfectly well what he has said and this demonstrates once more the deep study that he has made of the Magallanic Archipelago.

Can the Cagayan Valley tobacco be compared with that produced in North America in the States of Kentucky, Virginia, and Maryland? We firmly believe so.

The Cagayan Valley, and above all the province of Isabela, can produce tobacco very much superior to that now raised (or said to be) in that region; but the deplorable state of backwardness in which the cultivation, the curing, and the handling are found, makes that leaf (which could, if presented in the different markets of the world, obtain one of the foremost places) discarded at the present time because of its poor quality and even worse presentation.

About a decade ago the Philippine tobacco entered and was valued in the markets of Amsterdam, Trieste, Antwerp, Hamburg, London, Spain, and others. To-day it may be said to have become limited to the Spanish market, and this latter will be likewise lost very soon, for at the termination of the period of ten years provided by the treaty of Paris, and when Spanish goods cease to be favored by the tariffs, it is almost certain that the Spanish monthly mail steamers will also cease to ply, and then it is very probable that the doors of Spain will be closed to Philippine tobacco.

Now that the Philippine tobacco question is so much debated, both in America and in the Philippines, and prompted by the best wishes for and in defense of this industry, I propose to undertake a complete essay thereof, for which I will draw upon my experience of twenty-two consecutive years engaged therein.

No industry can be developed with probable success without counting beforehand with good first materials.

To judge by the fame acquired at one time by Filipino tobacco when it became free of the monopoly exercised upon it by the Spanish Government, anyone would have believed that this industry would make great strides.

Logically considered this belief was very natural, for once the business was delivered up to private enterprise and the planters were at liberty to sell their tobacco to the highest bidder it was to be supposed that both the tobacco cultivation and its industry would improve greatly. But the Philippine Islands have been and will be a country of hidden problems, and tobacco continues since then in an alarming state of retrogression.

What are the causes? We will endeavor to expose them clearly in the following articles.

The history of Filipino tobacco dates from the year 1783, when Governor-General Basco decreed that the government should have control of tobacco. Therefore, tobacco in the Philippines was monopolized exactly one century.

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The Government exercised entire monopoly both as to the leaf and the manufactured, for which purpose it had a corps of appraisers distributed over the different provinces and towns where the plant was cultivated. In Manila it had various factories for the manufacture of cigars, cigarettes, and smoking tobacco.

The chief appraiser, styled "interventor," resided in the capital of the province and had at his orders various subordinates called "alumnos aforadores."

These operated by districts composed of various towns, and in each town there was a "caudillo" (head man), who was at the same time "gobernadorcillo" (little governor), who, together with the "teniente" (overseer) of the tobacco fields, exercised the office of inspector of cultivation and was remunerated by a percentage of the crop.

The chief appraiser issued the order fixing the date upon which the first tobacco seed plot should be planted, for there were several, alternating generally every fifteen days.

These were common seed plots and occupied at least one-half a hectare of land each. Their care and weeding were in the hands of the old men, the women, and the children of their respective towns, while the able-bodied men engaged in plowing their lands and preparing them for transplanting the tobacco plant.

At first sight it would seem that the inspection exercised over the planter was somewhat oppressive, treating him as if he were a colonist or laborer not working his own property.

Nothing could be more erroneous. That wise inspection was purely paternal and, thanks to it, the tobacco seedlings were obtained in proper season. The lands were prepared with three plowings, at intervals of fifteen days each, and the transplanting was done, commencing with the highlands in the second half of November and ending with the lowlands in the first half of January, a period during which it is well known that the transplanting should be done. There is a common adage that says: "Mas vale llegar á tiempo que vendar un año" (It is better to arrive in time than to round about for a year); and following this most true maxim, we may say: "He who sows in time has an almost certainty of reaping a good crop."

A person acquainted with the beautiful plantations of the Cagayan Valley knows likewise that they are favored with fine, ambient temperature, humidity, adequate seasonable winds, and the proper chemical composition of the soil to bring forth as a result those magnificent tobacco leaves, the beau ideal of the smoker.

But this leaf, which at one time acquired justified fame, is being lost at gigantic strides within the past few years.

The tobacco now cultivated in the Cagayan Valley may be said, without doubt, to be almost a wild plant.

Planters, both on a large and small scale, seem to have united for the purpose of casting ill repute upon the Filipino tobacco.

I know that this assertion will bring forth cries of protest; but I have undertaken to publish a complete study of tobacco in its different phases, and if I now touch the sore spot of the planters, to-morrow I may touch that of the leaf-tobacco dealers, and later that of the manufacturers, for they are all and each one of them in their sphere of action responsible for the deplorable state of Filipino tobacco.

We said in our preceding article that once the tobacco business was delivered into the hands of private enterprise, it was to be supposed that both the cultivation and the industry would improve greatly.

True it is that the manufacture of tobacco is all that could be desired as to its presentation and style. The Filipino cigar maker has no rival. But, on the other hand, that special preparation of the tobacco, those secrets of manufacture which have given so much renown and profit to certain manufacturers—this art is yet in its infancy here, and we can voice it loudly.

Upon the abolishment of the government monopoly of tobacco in the year 1883, a mercantile company was established in the Philippines under the name of "Compañía General de Tabacos de Filipinas."

This powerful company began to operate then with a cash capital of £5,000,000.

It founded the great cigar and cigarette factory entitled "La Flor de la Isabela."

It secured the greater part of the leaf tobacco of the first crops, and thereby acquired almost in its entirety the monopoly in tobacco.

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In Isabela, Luzon, it bought from the Government and private parties extensive tracts of lands, known to-day as the San Antonio, San Luis, and Santa Isabel plantations. These plantations were populated by immigrants from the provinces of Ilocos Sur, Ilocos Norte, La Union, and Abra, likewise tobacco-growing districts, though not on the scale of Isabela and Cagayan. We wish to say by this that these colonists were not entirely ignorant of tobacco cultivation.

There was also founded at that time another tobacco plantation, named Malum, owned by the firm Baer, Senior & Co., and still another, which was of less importance, and for this reason we do not mention it herein.

It was to be presumed with justified reasons that these plantations would prove to be in time semiagricultural schools, wherefrom colonists would issue very much advanced in the cultivation, curing, and handling of tobacco, whose instruction would afterwards extend to the different towns of the Cagayan Valley, and even to the towns from where they had emigrated.

Before entering into the cause of the retrogression in leaf tobacco, and as a consequence that of the tobacco manufacture, I have need of making a statement:

Be it known now and forever that my writings do not attach, directly or indirectly, to any one given company, entity, or person.

I am one of the greatest enthusiasts for everything appertaining to tobacco.

I regret as much as anyone the great evil threatening others, and it is my duty to sound the alarm and at the same time to bare the facts in order to seek the remedies.

Having eased my conscience with this statement, we will now commence.

Those plantations which, as I have said before, were to be in a measure agricultural schools are in the same regrettable state of backwardness as that of a poor laborer who learned nothing more than the path shown him by his grandfather.

No machinery is to be found there. On the other hand, the ever-present carabao and the antiquated plow are there furrowing those extensive tobacco fields and not penetrating into the soil more than 12 or 14 centimeters.

There is not to be found a single rail or tramway nor any portable road whatever to gather and carry the product of the fields to the warehouses or shipping places.

No fertilizer is used, nor any irrigation, other than the fertilizing slime or mud annually left there by the great floods of the rivers and the rain sent down by providence.

If such is the case in the large plantations, what must be the conditions among the small, poor planters, who have no instruction, no capital, no animals, nor any kind of indispensable appliances to cultivate the land.

The foregoing are certainly ample reasons for not relying upon a good crop, but there are others worthy of a separate chapter.

PREPARATION OF THE SOIL FOR TOBACCO CULTURE.

To plow or dig the soil is good, for four reasons: (1) So that becoming spongy thereby, facility is afforded for the spread of the roots and for the circulation of air; (2) so that, bringing up and turning over the subsoil, the latter may be improved and thinned out by the heat of the sun; (3) to uproot the weeds which absorb the nutritive juices contained in the soil; (4) that by repeated labor the soil may retain its freshness, in order to impart to the vegetables the necessary juices during the heated term. The soil once prepared in this manner, the seed is sown, the plant takes hold, grows, and the fruit is borne by nature. Man has done nothing more than to combine the means.

The system of preparing the soil throughout the Cagayán Valley could not be worse. The tobacco lands there, if not used for corn after the tobacco crop, are left in a complete state of neglect; they fill up with weeds and with a dense growth of vines and other plants that do not allow the rays of the sun to enter, and that, moreover, suck all their substance, leaving them barren for the new crop.

Tobacco lands should be timely prepared, beginning to till them in the month of July or August for those in which corn was not grown, securing thereby two advantages: First, to kill the weeds by solar action; second, to air the soil thoroughly.

At present the major part of the lands commence to be tilled fifteen days or even less before the transplanting begins—a bad system, with fatal results.

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We have already spoken about the deficiency of the old plow, which should be replaced by the modern moldboard of very easy handling, and which besides penetrating deeper into the ground has the advantage of turning over the soil very much better than the one now in use.

Land for tobacco cultivation should be plowed three times, with intervals of one month between them, for lands whereon corn was not grown, and at least fifteen for these latter.

We also recommend that after plowing the native harrow should not be used. This is a very general and harmful custom. By this means all that is accomplished is to pulverize and flatten out the soil on the surface, and it prevents the penetration of the rays of the sun. Every good planter should know that the solar action is the best fertilizer that the soil receives.

FERTILIZERS.

We have yet to learn that any large or small planter has tried any kind of fertilizer.

It may, perhaps, be argued that the plantations of the Cagayán Valley do not need fertilizer because the deposit of alluvium brought periodically by the great overflows is sufficient to fertilize the soil, and that the plants do not suffer through lack of nutritive matter.

While it is true that most every year those plantations are benefited by the floods, it is no less true that these lands are in need of foreign fertilizers. An ample proof of this is that in Gamú, Ilagan, and other plantations annually fertilized by the rivers the crops are degenerating.

It is most true, and confirmed by thousands of experiments, that the cultivation of tobacco, carried on with the best conditions of soil and climate, is perfected greatly in quantity and quality if the planter employs scientific means in the nutrition of the plant.

Of the different analyses made of tobacco we draw the conclusion that the most select leaf is that cultivated in lands abounding in soluble salts of potash, which, besides promoting rapid development of the leaves, give them great fineness, flexibility, and aroma, without thereby increasing the quantity of nicotine.

Potash salts are obtained in the ashes of any kind of forest plants, burnt bamboo and others, and the richest in this substance are the very stalks of tobacco and corn.

Every tobacco planter will have noticed that when, after the great floods in their fields, the stalks, branches, and brush left thereon are burned there, the plants planted among these ashes acquired greater development than the rest. Their color was a deeper dark green, and the greater flexibility and fineness was clearly apparent.

Well, then, this having been observed, it is not difficult to select the fertilizer, and its acquisition is within every planter's reach.

We recommend as one of the best systems the formation of the "hormigueros," or heaps of burnt earth, a very antiquated mode of fertilizing the fields and of positive results in tobacco culture.

There is a more simple way still: Cover the surface of the land to be cultivated with a not too thick layer of branches, dry leaves, grass, or bamboo, and place on top another layer of dry earth, 1 or 2 inches deep; burn in proper season, and two or three days after this operation give one turn with a plow. By this means uniform fertilization of the whole field will have been obtained, and also the destruction by fire of innumerable grubs and larvæ of insects, which are tobacco's worst enemies.

TOBACCO SEED AND SEED PLOTS.

We consider the selection of seed of the greatest importance. It should be chosen from the most healthy and developed plants in each field, and the planter should mark them, even before budding, thereby preventing the mistake of rendering the seed useless when the women come to remove the sprouts or shoots and the buds. The selection of the seed should be made with great care, because of the immense variety and completely distinct conditions.

The seeds known as Maroqui, Vizcaya, and Havana, this latter known likewise by the name of "heart," due to its shape, are those which produce the largest quantity of light, fine, and clean wrappers.

The seeds known by the names of Romero, Morada, and Casira furnish an aromatic leaf suitable for fillers of good cigars and for select cut tobacco or "picadura."

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These plants bud very soon, but if the transplanting is done in the second half of November or first half of December, the cool north winds moderate their growth, they take deeper hold, and after that their development is greater, many times reaching up to twenty leaves in the first cutting.

As to the seeds Pampano and Espada, they should be discarded altogether. The first named gives a leaf similar to that of the cabbage, very much wrinkled toward the stalk, very coarse, and with very thick cross veins. The second named gives a very narrow leaf of "maduro" color and heavily charged with nicotine, for which reasons it is used solely for chewing tobacco.

Now that good wrappers are so scarce, we recommend to the municipalities to provide themselves with Sumatra seed. It produces a very fine, light-colored leaf, and if the transplanting is done early the leaves attain fairly good size.

This kind of seed was planted rather extensively in an important plantation in the Cagayán Valley and, in my humble opinion, the results were very satisfactory, and they would have been much more so if the transplanting had been made to soil of more strength, or that known there by the name of "jugus," wherein the plants obtain very much more development.

It has never been explained why this seed was discarded. I believe that it was an unfortunate mistake and that dire results will now be experienced.

SEED PLOTS.

There should be at least three, the first to be sown between the 15th and 20th of September, for, bearing in mind that the seed if well cared for obtains in between forty and fifty days, this enables the commencing of planting in the second half of November. We have already said that these plantings should be alternate and at intervals of about fifteen days each.

The selection of seed is not practiced at present. The planter, without caring to see if the plant is sound or diseased or noting this or that condition, gathers the seed from the field, and it is very frequently the case that it is taken from the sprouts or from the discarded plants. Hence the diversity of classes found even in small fields.

The seed plots outside of the plantations are formed in very bad conditions as to soil and weather, so that the planter who has been cautious and has secured his seed in good season has need of becoming a constant sentinel, and even then at the slightest lack of vigilance he is robbed of it. These thefts are likewise very frequent even after the transplantings.

All these evils would be avoided if the municipalities would follow the good custom of making common seed plots, as was done during the time of government monopoly and described herein.

TRANSPLANTING.

We have said that the transplanting of tobacco should be made in the high lands during the second half of November and in the low lands during the first half of December. This latter can be extended up to the 24th of the month at the latest.

These are called early plantings, and many years of experience have shown us that they are the best, for three distinct reasons: First, because after the recent rainy season the soil retains all the humidity; second, because the cool northern winds modify the growth of the plant, which, seeking the warmth of the soil, takes firmer hold, absorbs the nutritive juices, and the development is much greater both in quantity and quality; third, because the season of northerly winds extends throughout the month of January, bringing therewith some showers of fine rain, highly beneficial to the plants.

Now, unfortunately, just the reverse occurs. We frequently see that lands to be planted with tobacco are still entirely neglected, full of brush, and the planter does not even trouble himself to give it the first plowing.

These lands are afterwards cleared, plowed, and prepared at times in less than a week. The transplanting is poorly done, the soil is raw, has not been benefited by the sun's rays, and consequently is not vegetable soil. The roots of the weeds previously torn out again take hold immediately and the field is once more full of brush. The greater number of the plants die, and those that do not perish grow up stunted, diseased, and develop unevenly. The tobacco is extremely poor, of a yellowish color, gummy, slow to burn, and very bitter.

It is very risky to mix this tobacco with others, because it is very liable to heat and also to impart to the others its bad conditions of color, odor, and taste.

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The delay in the transplanting is due to nothing else than the little care given to the seed plots; sometimes owing to baguios, others to excessive rain, others to drought, and always to neglect; it happens that when the season for sowing arrives there are very few who have the seed ready, so that transplanting is done in the months of February and March, when the cutting of the first leaves should begin. Hence, the crops are scare, of poor quality, and of divers kinds and conditions.

Another feature of the greatest importance is the distance to be observed between the plants. The general custom at the present time is approximately 1 vara (about 33 inches). This is practiced in all the lands as if they were of like condition. We agree to that distance as to the walks, but not between plants.

The beautiful plantations of the Cagayan Valley are formed of lands rich in organic elements of great nutritive strength, and in these lands we consider the distance between plants as excessive. Hence, it happens that the plants give out an excessive amount of foliage and there is need of frequent gleaning; otherwise a small forest would be formed.

Due to the excessive distance, the plants absorb a greater quantity than necessary for their nourishment, resulting in very thick leaves with very pronounced cross veins, of difficult application and usefulness for fine wrappers.

For the same reason the colors "maduro" and "colorado maduro" predominate, and we find the colors "claro" and "colorado claro" only in the leaves, called in Ilocano "lapa en ibanag" and "palaspas." These are leaves near the ground, and sheltered, therefore, from the sun and the wind.

The distances that should be observed are 80 centimeters for the walks and 65 centimeters between plants. With these distances will be obtained the following valuable advantages: First, in the same space a much greater crop; second, by the distribution of the juices of the soil affected by the increase of plants the leaves will be finer; third, through the shade mutually afforded the much-desired colors "claro" and "colorado claro" will be obtained.

The plantings having been made as explained in the preceding chapter, we must now look after the maintenance, cleaning, and cutting.

All the operations in tobacco culture are of such importance that we compare them to a complicated machine, wherein several geared wheels work together.

From the moment that the seed is put into the ground until the tobacco goes into the market in the shape of cigars and cigarettes it passes through many delicate manipulations.

So that in order to explain the causes of the depreciation of Filipino tobacco within the last few years and to suggest the remedies, based on many years of study and experience, it becomes necessary to publish various articles, which we do not doubt will be read with interest by all those engaged in the culture and manufacture of tobacco.

It many times happens that the plants carry from the very seed plot the grubs and larvæ of insects, the destruction of which is very necessary.

When the seed plot is attacked by the worm and it is desired to prevent the propagation of the plague to the plantations, it should be destroyed within the seed plot itself; for which purpose a not very thick lye of ashes and boiling water should be made, and when cold the seed plot should be irrigated therewith. It is only in very rare cases that this has to be repeated.

If the field wherein the transplanting has been made has been previously fertilized with ashes and burned earth, as we have suggested, it can be guaranteed that the worm will not make itself very visible, for the potash salts, besides being the best fertilizer for tobacco, have the quality of destroying the parasitical insects of the plant in over 60 per cent.

Besides attending to the removal of the worms morning and evening, it is advisable to make bonfires at night at the margins of the tobacco fields, whereby the butterflies will be drawn into them by the light and perish in the flames, instead of depositing their larvæ on the plants.

Frequently one or two sprouts or shoots are allowed to remain on the plant, and this, although it increases the crop, is not at all advisable, because the leaves grow smaller and of inferior quality generally and those of the high grade diminish.

When the plants have entirely developed they bud, and it is advisable to at once nip the buds before they flower.

When doing this, care should be taken not to bud the plants previously marked for seed, and, as we have said before, these plants should be selected for the fineness, elasticity, and width of the leaves.

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Once the budding has been done the sap becomes distributed into the leaves of the plants, and immediately they begin to mature.

Many times have I noticed that leaves were cut before maturity and others when overmatured. In both cases the leaf entirely loses color, aroma, and flexibility, which are indispensable conditions for manufacture.

We therefore recommend that the cutting be done when the leaves begin to lose their dark-green color and when seen from within toward the light small blisters are noted. It is then that the leaves are in condition for cutting. It should be done during the heat of the day, because it is very harmful to cut in the early morning hours, when the plants are covered with the night dew.

We likewise recommend the cutting after the full moon, because the tobacco plant, as all other plants in general, contains a greater quantity of liquids when the moon is crescent, which liquids are a source of innumerable difficulties in the curing, with marked tendency to decomposition.

DRYING HOUSES.

Ninety per cent of tobacco planters do not attach importance to the operation of airing and drying the leaves. Through badly understood economy they do not build drying houses, and those that are built do not have the necessary conditions for a good drying process.

They should be built in well-ventilated places, somewhat distant from rivers and as far away as possible from lakes and swamps.

They can be plain, i. e., of cane and bamboo only, but inclosed with latticework doors and windows, and not in the form of sheds, as a good many are constructed. The lattices should be as close as possible to prevent incoming rain and the humidity of the atmosphere.

It is well known that the green leaves of tobacco, when drying, absorb all the oxygen of the atmosphere, which makes breathing very difficult inside of the drying houses, for which reason we advise the planters to abandon the bad habit of drying tobacco inside of their dwellings.

The leaves in decomposition exhale gases charged with nicotine, and they are dangerous for people living there. It is this that causes the frequent pernicious fevers known by the name "Cagayán fever."

We have already said that the majority of the planters do not attach importance to the tobacco drying, whilst a good method in that respect is almost a guaranty of a good crop.

Tobacco is at present allowed to dry by the sun. If it rains they cover it (but not always) with a few banana leaves, which cover it so deficiently that in most instances it becomes completely soaked. At night it is left out exposed to the weather and receives all the dew sent down by God.

With that method of drying it is entirely impossible to obtain good tobacco, for the leaves with excess of humidity attain a variegated color, with black and greenish stains, they lose combustibility and aroma, and acquire a bad odor produced by mold.

The best system known to us, and which has given very good results, is the following:

Once the drying houses or camarines have been built in the form herein described, place inside a "pala pala" (scaffolding), made of bamboo, both vertically and horizontally, leaving a passageway along the whole center, with a connecting door at either end of the building.

The "hands" of leaves, composed usually of one hundred, are then hung on the different rings of the "pala pala," taking care that they do not touch each other.

Should the weather be damp and rainy it is advisable to introduce smoke into the building, thereby killing the vegetable parasites on the leaves without injuring in the least the good quality of the tobacco, provided that the smoke is not excessive, and the plants burned for that purpose were not resinous.

During extremely damp weather the doors and windows should be closed to avoid the circulation of damp air, and it should be endeavored to keep up a dry temperature by means of smoke.

Should the weather be dry with northeast monsoon winds, usually prevalent at that time, the doors and windows on that side should be closed and the opposite ones opened, thereby avoiding the hasty drying and shrinking of the leaves. It is advisable to interchange the "hands" of leaves that have been more exposed to the heat with those which were in a lower temperature within the camarine.

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There is nothing easier than to obtain uniform drying within the drying houses or camarines by means of a thermometer and taking care to maintain, whether by ventilation in dry weather or by fires and smoke in wet weather, a maximum temperature of 36° and a minimum of 25°.

Should it be observed during the drying process that some leaves have become moldy through excess of humidity it is advisable to take them out and expose them to the sun, thereby killing in a few hours this injurious fungous vegetation.

THE PILING OF LEAF TOBACCO.

The leaves having been dried as described in the previous chapter the piling up, or "mandalas," is proceeded with.

The name of "mandala" is given to the piles of dried leaf tobacco removed from the drying storehouses.

The purpose of making up into mandalas is to make tobacco smokable by means of fermentation:

Mandalas should be two at least, and to this end a careful selection of all sound and clean leaves should be made, with which we will form the first mandala. In the second we may likewise place all leaves of inferior quality, as well as all such as during their drying may have become mildewed through excess of dampness.

The object in segregating the mandalas is to prevent the bad leaves transmitting their bad conditions of odor and taste through fermentation to the good ones.

The fermentation of tobacco in mandalas should be slow, as an excess of heat would injure it very much as regards color, flexibility, and weight.

It is therefore our advice that when 60° are reached, which is the maximum temperature to be allowed to tobacco, it should be overturned twice—when the temperature reaches 45° and 55°, respectively—a third one to be given at 60°.

It must not be taken that as the maximum temperature has been reached tobacco is now cured. Nothing would be more erroneous. The period of fermentation of tobacco in no case is under seventy-five to ninety days, and during such period it should be overturned in succession, until the fever gets down to the same temperature with which it started.

The fermentation of the tobacco having been completed, its selection and classification should now be proceeded with, put up into hands and getting it ready for appraisal and baling.

It has been thoroughly demonstrated that a maximum thermometer is indispensable to every good tobacco grower. Now, then, I may assume without the risk of erring, that outside of the plantations there are not ten thermometers in the whole of the Cagayan Valley.

With the proper use of a thermometer incalculable advantages may be obtained.

If our crops consist of thin leaves, elastic, and of a light color, nothing is easier than to preserve such conditions.

It is a known fact that at a maximum temperature of 60° tobacco obtains a high color, and the leaf loses part of its elasticity; combustibility and aroma, however, being increased.

In order to preserve the two former qualities we must endeavor not to allow the temperature inside the mandala to exceed 50°.

If the tobacco is gummy, it comes from high or thin lands, and if it is found with a decided tendency to become worm-eaten, there is nothing easier than to destroy the germs by means of fevers, and if the leaves are not sufficiently juicy, and it were therefore impossible to raise a temperature of 60° to 65°, a liquid obtained by the boiling of tobacco of good quality may be added by means of a fine sprinkler or a sprayer, in order that the leaf may become sufficiently damp to insure a good fermentation, and we will then have placed the tobacco in such a condition that it will not be worm-eaten for a long time.

We therefore recommend as an indispensable instrument to all good tobacco growers the use of a maximum thermometer, whereby they may observe their mandalas, on the assurance that they shall never become overheated, besides other advantages already pointed out.

APPRAISEMENT.

In the course of this essay we have set forth numerous reasons by which it is shown that the leaf tobacco raised in the Cagayan Valley can not be good; and it is evident that such tobacco, being the only one which could be exported

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to the United States, as stated by the honorable Mr. Taft, there exists no reason why the American tobacco dealers should object to the reduction in the Dingley tariff.

An analysis of the causes and their effects having been made, the complaint turns out to be a very deeply rooted one. The disease has become a chronic one, and there is no remedy but to apply the lancet if we wish to extirpate the cancer that is gradually undermining the patient's life.

Anyone acquainted with the history of the Philippines is also aware that it is not many years ago when the provinces of Ilocos Sur and Ilocos Norte were rich, and very rich. Their chief production was indigo, which, whilst it was all handled by Filipino and Spanish merchants, was admitted to and in great demand in the principal markets of the financial world; classes 5 to 8, which are the superior kinds, being then quite abundant, and were compared in Europe to the unequaled "Blue" of Guatemala.

There came a third merchant—and we all know who he is—and with his unscrupulous conscience commenced, as always, his adulterations. He added lime and other substances, and a perfectly unknown indigo was offered in the markets. This caused its discredit, the outcome being its total disappearance.

Misery, with all the consequences thereof, did not take long to invade said provinces, and their inhabitants, almost to one-half of them, had to emigrate to other provinces in this archipelago.

This is the history of indigo, known to everyone, and this is the same course which the tobacco industry follows with gigantic steps.

After the close of the monopoly few were the firms who engaged in the leaf-tobacco trade. The following may be cited as the principal ones: Compañía General de Tobacos de Filipinas, La Insular, Baer, Senior & Co., El Oriente, and a few Spanish merchants.

Whilst the leaf-tobacco trade was in such hands, everything went on nicely. The Philippine tobacco began to get a name all over Europe and almost completely secured the Far Eastern markets, frankly and loyally competing with tobacco from Habana, Lataquie, Virginia, Kentucky, Maryland, and other countries.

Then came the shrewd indigo merchant, who never starts but when an article is known and has an extensive good name, and then with his adulterations and frauds commences business without fear of making mistakes.

Thus he commenced his gatherings of leaf tobacco in the Cagayan Valley on a small scale at first in the same way as white ants make their first appearance in a sumptuous building until they finally get hold of it and demolish it.

The provinces of Cagayan and Isabela produce an average yearly yield of not less than 250,000 quintals, the value of which varies between 2,500,000 and 3,000,000 pesos.

It would seem at first sight that with such a handsome capital annually received by the inhabitants of both provinces, which do not reach 300,000, they ought to enjoy general prosperity. Nothing of the kind; said provinces are at present utterly poor.

The aforementioned unscrupulous trader, called a Chinaman, has secured all the trade the native needs to avail himself of and furnishes it to him at fabulous prices.

Should another merchant coming from a different quarter engage in the same business it does not take them long to overthrow him, and in this way complete monopoly is exercised.

They are also the sole money lenders, whose usual interest is that of 1 peso for a peso, and considering that they grant loans for six months at the most they earn an annual profit of 200 per cent.

There is even more. When the loan is made in goods they are in the habit of increasing the values to 25 per cent higher than the selling price, making barter compulsory, or to deliver tobacco for the total value of goods received, such delivery to be made on the 30th day of June at the latest.

Thus it results that the planter is compelled to dispose of his tobacco without proper curing, and, as a consequence thereof, the tobacco is raw, has a bad color, and is overcharged with nicotine, and in such a condition it is brought to the market.

Besides the great quantity of leaf tobacco obtained by them through the above means, they purchase in considerable proportion, competing with all the firms engaged in this business.

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The class selected by them is the "4a Superior," a large leaf, a poor wrapper, but of good quality, and they pay for it higher prices than set down in the schedules.

This tobacco, obtained from the grower by means of flattery, offering him a deceitful profit, is used by them for mixing with the higher classes, thus doubling, or even trebling, the purchase price.

The lack of harmony which exists among the important firms, and the bitter competition made by Chinese, has given as a result that the leaf is classified or appraised too soon, the weed not having, therefore, been properly matured. The tobacco growers, on being pressed to dispose of their crops, arrange them carelessly; hence the diversity of class and color which is often found even in the same bundle.

The carelessness in the preparation of leaf tobacco, as well as the numberless causes we have described above, have given us the fatal result that the consumption of Philippine tobacco is already limited to our own home.

Tobacco being an article which should be offered for the market properly classified, we claim that it should be subject to regulations in its appraisal. In order to achieve this, we consider it as of absolute necessity that all tobacco dealers should form a guild, prepare a code under the laws of commerce, and appoint a tribunal formed by several of the best-known expert appraisers, to decide all matters connected with the legality of appraisals made.

The tobacco industry in the Philippines consists of more than 300 factories, located for the most part in Manila. Out of this number only four gather a portion of their stock in the Cagayan Valley, being compelled to complete in Manila the balance of the leaf tobacco they need for their own consumption. This fully shows that more than one-half of the crops is gathered in by Chinese dealers, and as they have the monopoly of the leaf tobacco in Manila they impose on purchasers, who have to submit to their classification and consent to having tobacco from Cagayan and Isabela mixed with leaf from Barili, Abra, and other places, as we have often witnessed.

The classification offered in this city is really scandalous, or, to say it more properly, an iniquitous robbery is being committed. As previously stated, the "4a Superior," which is a leaf of good quality, although broken, is mixed with the superior classes, above all with class "1a," which is of the same size.

The first-class tobacco is formed of whole leaves, clean and of a uniform color. The package or bale, as it is called here, weighs from 2½ to 3 quintals. The average quintal consists of approximately 80 hands of 100 leaves each, and, taking as a base the package of 2½ quintals, we obtain a total of 200 hands, which multiplied by 100, which each hand contains, would give us 20,000 leaves. As the leaves consist of two halves divided by the stem, it is evident that each half gives us at least one wrapper, in which case each package should afford as a minimum 40,000 wrappers.

However, you may well be frightened, but there is no exaggeration in what we are about to tell you.

Any factory turning out at present from 40,000 to 50,000 cigars of special brands needs to open at least 20 packages of 1a, which if properly classified should afford 800,000 wrappers. It may be seen, therefore, that the tobacco industry can not stand this a long time.

We are on a slippery road which leads us to a precipice unless we try soon to put a stop to this.

The tobacco industry in the Philippines is the leading one in importance, for the many millions invested therein, the large tracts exclusively producing tobacco, the many thousands of workmen who earn a living from it, and finally because it is the most important revenue obtained by the government. We consider that these are matters of such importance that our voice will echo sufficiently so that it may be heard by those persons who more or less are affected by everything relating to tobacco matters.

We are hopeful of having discovered a scheme which, if carried into practice, will yield great results, and by not publishing it herein we only take the precaution not to show our enemy our plans of attack and defense.

SAUCES FOR TOBACCO.

Although understanding that any technical person in a cigar factory knows such parts or matters of which tobacco is formed, we do not think it is out of the way to publish one of the most recent analyses.

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ANALYSIS.

Inorganic bodies: Ammonia; azoic acid; alum; lime; hydrochloric, sulphuric, and phosphoric acids; potash; magnesia; iron; soda; silica, and manganese.

Organic elements: Nicotine, tabacic acid (malic), citric, acetic, oxalic, pectic, and ulmic.

Neutral compounds which we name *meocianine*, cellulose, yellow and green resins, wax or greasy matter, and nitrogenous matter.

Now, then, the most essential portions of which tobacco is composed being now known, there is nothing easier for an intelligent cigar manufacturer than turning a common cigar into an excellent veguero.

As a matter of fact, by means of such sauces, tobacco may be made old; by means of sauces aroma and combustibility may be imparted; by means of sauces it is possible to destroy the germs of the weevil and cause tobacco to keep for a long time; by means of sauces a white ash is obtainable; and finally, by means of sauces manufactured tobacco may be kept flexible and glossy, as if it were freshly manufactured.

It will not be out of place to hint that along with the sauces there should be thermometrical observations of the fever which tobacco must undergo, without which the study would be incomplete.

Few are the industries which, like that of the tobacco, offer a good field to study, or which, through manipulation, their products offer immense profits.

Therefore, being convinced thereof from experience, we urge our friends to go on constantly in their observations and study, assuring them that sooner or later they will attain the benefits we have enumerated.

There would be nothing easier to me than to publish a few recipes which have given positive results; but to include them it would be necessary to be acquainted with the class of tobacco we are to employ (since all tobaccos are not of equal conditions), and my work would be of no avail, besides being, on the other hand, manufacturers' secrets, so we do not feel warranted in giving them out.

We now consider this information as ended, and we should feel well pleased if, by the aid of our observations, we finally succeed in assisting the tobacco industry of the Philippines to again occupy the rank it so justly deserves to be in.

APPENDIX O.

AGREEMENT ENTERED INTO BY THE CIGAR AND CIGARETTE MANUFACTURERS OF MANILA ON MAY 18, 1905, FOR THE PURPOSE OF ENCOURAGING THE PRODUCTION OF TOBACCO LEAF IN THE PROVINCES OF CAGAYAN AND ISABELA AND TO IMPROVE THE QUALITY AND SECURE UNIFORMITY IN THE SORTING OF THE LEAF.

RULES RECOMMENDED FOR THE GATHERING AND SORTING OF TOBACCO IN THE CAGAYAN VALLEY AND FOR PURCHASES MADE IN MANILA.

In order to avoid the total loss of the esteem in which Philippine tobacco was held in olden times, ruining planters who earn their living therefrom, injuring more or less everyone concerned in the trade and the tobacco manufacturing industries, it is of the highest interest that all such elements should cooperate to improve the cultivation, preparation, and sorting of the tobacco leaf. The support of the authorities should be solicited, who, by simple measures of good government, enacted for the good of this country, may do a great deal toward causing said product to recover the good name it had when under the monopoly of the Spanish Government, and even for several years thereafter, until planters began to lose the habit to work and thereby the tobacco-producing regions their prosperity.

It is likewise necessary that purchasers should, by mutual accord, establish and observe rules to insure uniformity in their purchases and to compel planters to do their best, as formerly they did, in the work of cultivation and the preparation of the leaf.

It is not our intent to reduce present prices, such as the bad quality of the weed during late years would warrant, for the reason that production would thereby be killed; our main object is simply to encourage production. We therefore recommend that existing prices be kept up according to the estab-

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lished classification which is now more or less strictly accepted as a basis for appraisement.

An agreement should also be made in order to avoid the intrusion of middlemen in purchases made, such persons being as prejudicial as brokers are between the purchaser and the planter, not merely because the commission they charge uselessly enhances the price of tobacco, but also because such manner of appraisement lends itself to hiding the impositions and derelictions of subordinates and because it hinders the direct dealing between the buyer and the seller, which is the most convenient, proper, and just way to effect purchases.

Something should also be agreed to in order to put a stop to the imposition of the gatherers (acaparadores), mostly Chinamen, who, after buying to advantage and often in exchange for goods of a doubtful quality, trusting that at the present day everything is allowed to pass, sort and pack the tobacco leaf to suit themelves and increase their gains when selling in bulk.

In view of all the above reasons, the purchasers who sign this writing agree to establish the prices and rules given below and engage to observe the same during one year, without prejudice to an extension of time by means of a new agreement.

First. The appraisement of leaf tobacco in sticks, counted or in bulk, is absolutely suppressed; such appraisement to be made only by hands (manos) of 100 leaves, well arranged and pressed.

Second. Purchases to be made solely from planters under a fair appraisement by classes and at the following prices:

Bale of—	
Primera	₱14.25
Segunda	9.00
Tercera	4.12½
Cuarta superior	2.00
Cuarta corriente	1.50
Quinta	.50

Third. No brokers or middlemen of any kind whatsoever to be employed, and no lots are to be purchased at lump prices, not even from planters themselves.

Fourth. The "tips" (rewards) which have been given in late years to the planters, as well as payment for the transportation of tobacco delivered for appraisement in the drying warehouses, are to cease.

Fifth. As far as possible purchasing in Manila is to be avoided. Should any of the firms signing this agreement be in need of leaf tobacco, notice should be sent to all the other firms and, in case it should be convenient, the other firms will furnish the tobacco needed, and if not convenient the purchase should be by appraisement, selecting at least 20 per cent for each class of leaf.

SUGGESTIONS FOR IMPROVING THE CULTIVATION OF THE TOBACCO PLANT IN CAGAYAN AND ISABELA.

The government to advise planters as follows:

1. Not to plant tobacco in too poor or worn-out lands.
2. An annual rotation of seed between the different municipalities, such as Echague-Cabagan; Angadanan-Tuguegarao, etc., in order to avoid degeneration of the plant.
3. Fields to be previously well prepared for planting, the earth loosened so as to expose it to the influence of the atmosphere and the rays of the sun.
4. To keep the fields well cleaned.
5. To see that seed beds or nurseries are in perfect condition and sprinkled with a solution of ashes and water which kills all insects or larvæ.
6. Transplanting to be carefully done, selection being made of sound and vigorous small plants having well developed and uninjured roots, so that they will catch and feed well.
7. Plants to be well hilled.
8. Plants to be pruned in time so as to limit the number of leaves each one should produce of perfect condition and quality.
9. Leaves to be cut off when the right conditions are reached.
10. To avoid putrefaction which would weaken the cellular tissue of leaves, thereby losing elasticity, leaves should, without loss of time, be strung on sticks.
11. Such sticks should be hung up in a well-ventilated drying warehouse, not allowing the rays of the sun or night dew to enter therein.

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12. To strictly prohibit that such sticks be hung up on bamboos in the open air.
13. As soon as the leaves have dried, sticks should be formed into mandalas of good size and well covered up so that fermentation may set in, and they should be turned over at least once.
14. Classification to be made under the old estanco system (under Spanish Government monopoly).
15. That the purchase of leaf tobacco strung on sticks be prohibited.

APPENDIX P.

MEMORANDA FURNISHED BY COMPAÑÍA GENERAL DE TABACOS DE FILIPINAS REGARDING AMOUNT AND QUALITY OF TOBACCO LEAF RAISED IN PROVINCES OF CAGAYAN AND ISABELA.

ISABELA AND CAGAYAN TOBACCO LEAF.

1. It is not possible to state accurately the annual production of leaf tobacco in the provinces of Isabela and Cagayan. It depends upon the weather; if it be favorable an abundant crop is the result, otherwise it becomes diminished to one-half or even one-third. However, taking five successive crops as a basis, an average annual yield of about 200,000 quintals may be estimated.

2. Proportion of cultivated tobacco that can be utilized:

(*a*) For wrappers, 10 per cent; only one-half of 1 per cent being suited for fine-grade cigars.

(*b*) For fillers and (*c*) for cut tobacco, etc., 90 per cent.

3. The proportion of (*a*), (*b*), and (*c*) used in manufacture is 35 per cent for (*a*) and 65 per cent for (*b*) and (*c*), or filler and remnants. Of the 35 per cent only two-thirds can be utilized.

4. The Compañía General de Tabacos de Filipinas has done everything possible and has used all available means to improve the quality of tobacco, instructing the planter as to the manner in which he should cultivate it, and even furnishing thermometers exclusively for tobacco in order to gauge the temperature it should undergo in its various fermentations, and rejecting, when presented for sale, tobacco not in proper condition or which had been badly handled. Thereby some improvement was obtained both in cultivation and curing, but within the last few years, during which local consumption has increased, due perhaps to the greater number of smokers, and since the buyers commenced to purchase the leaf in any condition, without proper seasoning or curing, including purchases of the uncut leaf in the field, the planters, seeing that they were paid alike whether they took proper care or not, became careless, and, disregarding the quality of the leaf, sought only to make money. We are now suffering the consequences by the ill-repute of Filipino tobacco in all the markets of the world. Those who have contributed the most to this great injury have been the Chinese, who do not conform to commercial usages, and who have discredited and demoralized this market.

5. The means of transportation are very deficient, due to the poor condition of the highway and the lack of tributary roads. There is but the one waterway available, only in the rainy season and when the rivers overflow.

The means of transportation could be improved by the construction of a railway from Echague to Aparri, and immediate results could be obtained by a good dredging of the entire length of the river, so that it might be navigable in all seasons of the year.

6. There is great difficulty in meeting the demand for the different "claro" and "oscuro" colors through scarcity of wrappers. The demand for "claro" colors is greater day by day, for where formerly in the Philippines "maduro" was solely sold now only "claro" is demanded. There has been much decrease in the production of light-colored, clean, nice leaves of fine texture since the discontinuance of the monopoly. Since that time tobacco-leaf culture began to be neglected, and especially has this been the case since 1900, owing to the rise in prices and to local competition.

The methods of cultivation employed by the independent planters have greatly depreciated, and the advice and perhaps the cooperation of the provincial authorities are needed to better the situation.

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APPENDIX Q.

CULTIVATION OF TOBACCO.

[By Clarence W. Dorsey, soil physicist, in charge of soil investigations. Farmers' Bulletin No. 5, Bureau of Agriculture.]

INTRODUCTION.

In the present paper an effort will be made to describe briefly the methods employed in modern cultivation of tobacco, to treat of recent successes in growing tobacco under shade in the United States, and also describe the conditions of tobacco culture in Sumatra, with especial reference to the industry in the Philippines.

In the preparation of this paper the bulletins of the United States Department of Agriculture relating to the cultivation of tobacco have been very freely used, and much information has been obtained from the gentlemen connected with the leading tobacco companies in Manila.

Philippine tobacco has long been held in high esteem in the Orient, and Manila cigars maintain the same rank in eastern countries that Habana cigars occupy in Europe and America. To-day tobacco stands third among the exports from the Philippines. During the year 1900, according to the Monthly Summary of Commerce and Finance of the United States, 11,743,336 kilos of tobacco, valued at $1,906,436 United States currency, were exported from the islands. Tobacco was introduced into the Philippines shortly after the Spaniards took possession, seed having been brought from Mexico by Spanish missionaries. Little effort was made by the Government to restrict or encourage the cultivation of tobacco until 1781, when the cultivation and sale of tobacco was decreed a state monopoly. While this monopoly was in force the natives in the large tobacco districts of Luzon were subjected to great inconveniences and even hardships. Each family was compelled to grow 4,000 plants and deliver the entire crop to the agents of the Government. None of the crop could be reserved for the use of the planter, and a fine was imposed when the crop was short. After the crop was harvested the leaves were selected and bought by Government agents, and bundles of inferior leaves were rejected and burned. Native houses were searched for concealed tobacco and fines and penalties imposed on those who did not comply with all the requirements of the monopoly. Early in the nineteenth century many riots and disturbances arose out of the difficulties in meeting the harsh provisions of the law.

In the Visayan and southern islands the monopoly was not in force, but tobacco raising was not generally practiced until the middle of the nineteenth century. The profits from the monopoly annually amounted to several million pesos, but was finally abolished on December 31, 1882. Since that time the cultivation and manufacture of the crop has been in the hands of private individuals and companies. At the present time the greater part of the tobacco grown in the islands comes from Luzon. The products of Isabela and Cagayan provinces are the most highly esteemed, while considerable quantities are produced in Union and the Ilocos provinces, on the west coast of northern Luzon. Nueva Ecija formerly raised a fair grade of tobacco, but the cultivation has fallen off in late years. The writer saw in Batangas Province many small fields that would aggregate many hundreds of hectares of tobacco. This is largely used for local consumption and is of inferior quality. Tobacco is grown in small quantities in the Visayan and southern islands, the greatest amounts probably being produced in Masbate, Tablas, Panay, Bohol, Leyte, Siquijor, Negros, and Mindanao.

Philippine tobacco is nearly all utilized in the manufacture of cigars and cigarettes, and finds a ready sale in Spain (which consumes more than one-half of the total production), England, Hongkong (where it is shipped to Asiatic ports), and British East India. During the year 1900 these countries bought more than seven-tenths of the entire crop. The agreeable aroma and flavor of the better grades of tobacco grown in the islands have won for it a high place among the fine cigar tobaccos of the world, and for a long time it ranked next to the celebrated Cuban tobacco. When we consider the desirable qualities of Philippine tobacco with the imperfect cultivation, curing, and fermentation it receives and the improvements and advances that have been made in other tobacco countries, it becomes at once evident that every care and attention

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should be given the crop to enable it to regain its former position, if not to make it superior to the finest tobaccos grown in the world.

The markets of the United States offer every inducement for the improvement and spread of the Philippine tobacco industry. This becomes all the more evident when we consider the vast sums of money annually expended by the United States for foreign tobacco. During the year ending June 30, 1900, the United States, according to official statistics of the agricultural imports of the United States, paid for Cuban tobacco $7,615,991, United States currency, and $4,569,271, United States currency, for Sumatra tobacco. During this same year the Philippines exported to the United States only a few hundreds of dollars worth of tobacco, or less than one-hundredth of 1 per cent of the tobacco importations of that country. While it may be true that Philippine tobacco may never entirely supplant Cuban and Sumatra tobacco in the United States, there is certainly every inducement to encourage and improve the industry until modern cultural methods have realized to the fullest extent the highest perfection of the crop.

REQUIREMENTS OF THE TOBACCO MANUFACTURER.

In the manufacture of high-grade cirgars certain essentials are necessary. The tobacco must burn smoothly and freely, with a pleasant taste, not rank and strong, nor too mild. When the taste is pleasant, not sharp and bitter, the aroma will invariably be good. The cigar that possesses the above qualities will meet with a ready sale. The wrapper of the cigar, as distinguished from the filler, must be light in color, rich in grain, thin in texture, small in vein and stem, very elastic, and of good burning quality. It should stretch and cover well, have little aroma, and appear well on the cigar. The most desirable sizes are 40 and 45 centimeter leaves, for from such leaves the manufacturer can obtain four cigar wrappers from each leaf, with but little waste. After such a suitable wrapper leaf is grown it must be properly cured, assorted, and classified. The manufacturer can never afford to pay a high price for a bale of tobacco unless he can calculate just how many suitable leaves it will contain. This is one reason why Sumatra tobacco commands such a high value, for so carefully is the grading and assorting done that the manufacturer knows how many cigars each package of tobacco will wrap, and that the color will be uniform. Wrapper tobacco should be uniform in size, color, and texture; then the buyer knows what he is getting and is willing to pay a good price.

For cigar fillers the leaves should be somewhat shorter, of medium body, have a rich brown color, and burn smoothly and freely. The quality of the filler determines the character of the cigar; hence the filler must possess the desirable aroma that distinguishes a good cigar.

The Philippine tobacco has some of the above properties and has earned its reputation on account of its agreeable aroma, fine veins, and notable elasticity. This applies only to the better quality of tobacco grown on the alluvial lands of the Cagayan River in northern Luzon. The tobacco grown in the Visayan Islands is coarser, uneven in color, and of greater strength. From the provinces along the west coast of northern Luzon the tobacco is of heavy body, and that grown near the sea has but little combustibility. Its ragged, broken character also lowers its market value. The tobacco grown in Nueva Ecija was formerly considered fine, but the color was a decided yellow and the taste somewhat bitter.

PREPARATION OF SEED BED.

No step in the cultivation of tobacco is more important than proper care in the preparation and sowing of the seed beds. This work can not be neglected without running the risk of a partial or total failure of the crop. To make good seed beds is a laborious task and requires good judgment in the selection of the location, soil, and in the preparation of the land. To have plenty of good, strong, healthy plants is the surest foundation for a good crop of tobacco, provided they are from seed true to the desired standard. It is very important that in the preparation of the seed bed an abundant supply of seed should be sown and provisions made for a succession of plants, so that when the planting season comes the supply of plants suitable for transplanting will be ample for the purpose and the supply will be maintained throughout the period in which the planting is to be done.

The best soil for the seed bed is a rich, friable, dark, virgin loam or sandy loam. A deep, well-drained soil is greatly to be preferred. The necessary oper-

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ations of tilling and stirring the soil should precede sowing the seed by several weeks. It is usually customary to thoroughly plow or spade the land and mark the land off into a number of beds surrounded by boards. In the famous Deli district in Sumatra the beds are built up about 30 centimeters high and surrounded by ditches. The size and number of the beds vary, but they are usually rectangular in size, with suitable walks or passageways between them. The beds are highly fertilized with rich manures or with any complete, specially prepared commercial fertilizer. Stable manure or any complete guano may be used. Care should be taken to thoroughly mix the fertilizer with the soil, so that the greatest amount of plant food may be available for the young plants. In the case of old lands it is always advisable to burn the land over to insure safety against grass and weeds. With new land the trouble from such sources is slight, but burning is sometimes practiced to increase the richness of the soil by adding the fertilizing properties of the burned wood. The burning is usually done one week before planting the seed. After burning, the soil is well spaded and all roots and tufts are carefully removed, and the surface made loose and smooth. Then the soil is well watered and the seed, mixed with sand or sifted wood ashes, are nicely spread over the surface. After the seeds are sown the soil should be thoroughly compacted with a heavy roller, and if the soil is at all dry the beds should be watered and kept continuously moist, but not wet, until the plants are set out. It is best to plan new seed beds at intervals of every few days, in order to be sure to always have fresh plants of proper size on hand when the time comes for transplanting. On a commercial scale it requires about 45 grams of seed to sow a bed 1 hectare in size. In the Cagayan Valley the seed is sown in the beds during the latter part of September and the first weeks of October, while the transplanting is made during the early part of December. This period of planting the seed bed varies slightly in the different parts of the archipelago on account of the varied climatic conditions; but practically all of the transplanting is done during the month of December, as experience has shown this to be the best month for such operations. In many parts of the Philippines it will be found advisable to construct some sort of cover for the seed bed to protect the seeds and tender plants from the intense heat of the sun. A suitable shelter made of straw, cogon grass, or nipa palm, raised about 1 meter above the ground, will suffice. It should be so arranged that the covering can be put close together or spread out to regulate the amount of heat received by the small plants. After a few weeks this covering can be removed altogether and kept to serve for another bed. White ants and sometimes caterpillars and worms are destructive in the seed beds, and should be removed by hand or by mixtures of poisonous substances and water known to be effective in removing such pests. When the plants are drawn for transplanting great care should be taken to secure as much root as possible. It is usually considered the best practice to carefully wash away all particles of the seed-bed soil that cling to the roots, for the plants live and grow better when the roots are perfectly clean.

SELECTION OF THE LAND.

Few, if any, plants are so easily modified as tobacco by climate, soil, elevation, nearness to the sea, and different methods of cultivation. This is plainly demonstrated by the rapid changes which take place in the character of the leaf, flavor, aroma, and special fitness for the varied uses and for different markets in introducing seed of well-marked varieties into new districts. Each new class of soil, materially aided by climatic conditions, gives peculiar qualities to the cured leaf as to its flavor, texture, color, etc.

It has long been recognized that tobacco grown near the sea or large bodies of salt water has poor combustibility, and, while the taste may be sweet, it commands a low price for the manufacture of cigars on account of its poor burning qualities.

In tropical countries the favored locations for tobacco cultivation are the interior alluvial valleys. In such places the soils are usually deep, porous, easily stirred and cultivated, and the periodic overflow of the rivers adds new fertilizing elements to the soil, already rich in plant food. The famous tobacco districts of Isabela Province belong to this class, as well as the valley lands of the provinces of the west coast of Luzon. In the Cagayan valley the quantity of rainfall, according to two years' observation ending in 1897, is much less than at other points in the interior of Luzon, or in the southern islands. The total amount of rainfall during the year is 700 mm., the greater part of which falls

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during the period from June to October. During the months of January, February, and March, when the tobacco is growing and ripening, the rainfall does not exceed 20 mm. Comparing the climate of this region with the Deli district in Sumatra, it will be found that the climatic conditions of the latter region more closely resemble those of southern Luzon and some of the southern islands. The rainfall is distributed over the entire year, while the greatest amounts are recorded in October, November, and December. The total amount received during the year averages more than 2,000 mm. The stations in the Philippines, where equivalent or greater amounts of rainfall are recorded, are Bolinao, in Zambales Province, Albay, in southern Luzon, La Carlota, in western Negros, northeastern Mindanao, and Vigan, in Ilocos Sur Province.

In Sumatra, where the best results with tobacco have been obtained, the soils are mainly volcanic in origin. Where the finest and silkiest tobacco of a rich brown color is grown, the soils are clayey, while the lighter colors of fine cigar-wrapper tobacco are grown on loamy and sandy soils with clay subsoils. In the clayey soils of the Deli and Langkat districts, tobacco can often stand droughts of three weeks and longer, without much injury, but in these districts the frequent light showers are of great value to the growing crop. Experience has also shown in Sumatra that the best results have been obtained on land situated from 8 to 16 kilometers from the ocean, while tobacco plantations high up on the mountains have had poor success in growing fine, silky wrapper tobacco. The lowlands, free from frequent inundations and not too near the sea, with soils consisting largely of fine sand and silt, and rich in organic matter, have given the best results.

In the Philippines many fine bodies of interior valley land, with rich, loamy soils, can be found where tobacco cultivation has not been practiced, and it is on such tracts of land that its introduction is especially recommended. Mindanao possesses many large valleys with alluvial soils that could undoubtedly be made to produce a fine quality of tobacco. The soils of the large valley between Manila and the Lingayén Gulf should be carefully tested with seed from the famous tobacco districts of the world, to determine its fitness for growing tobacco. New areas are constantly being tried in various parts of the world, where tobacco growing was unknown, and the success of so many of these should prove an incentive to greater efforts on the part of the Philippine planter to enter into competition to furnish a goodly portion of the world's supply of this profitable crop. Only very recently the cultivation of Habana tobacco has been introduced into Annam and Tokin, in French Indo-China, and a portion of the crop exported to Manila. Such an example shows what may be accomplished by careful experimentation in the field of new crops, and should stimulate the energies of farmers in every part of the archipelago.

CULTIVATION OF THE CROP.

Since the profits of growing tobacco depend largely on the planter's ability to produce a leaf of such qualities as to make it desirable to the manufacturer, it follows that the greatest care should be exercised in the cultivation of the plant. Prior to the work of transplanting the ground should be thoroughly plowed or spaded to a considerable depth. Deep cultivation is advisable on any character of soils, as it readily allows the free percolation of rain and air through the soil, and increases the amount of available plant food contained in the soil, and helps to conserve the moisture, especially in times of drought. If only small amounts of manures are to be applied, it can be spread broadcast after the first plowing, but if large quantities of stable or straw manures are used, it is best to plow them in several weeks before the time of setting out the plants. After plowing, the land should be harrowed with a disk harrow, and then with a smoothing harrow. In Sumatra, where all of the operations are performed by Chinese coolies, the work of breaking the soil is performed by an implement called the "tyankol," a sort of spade, which takes the place of the plow, while the work of smoothing and reducing the soil to a fine state of tilth is accomplished by hoes and iron rakes. Either by plows and harrows or by spades and rakes, the field should be made loose and smooth before transplanting, or the young plants are at a disadvantage from the very start. The writer has seen many fields, especially in Batangas Province, where young tobacco plants were attempting to grow in a field filled with the hard clods of intractable clay soil. Such methods are to be condemned, for plants as tender and delicate as tobacco can not make a good growth in improperly prepared fields.

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Often it will be found advisable to water the field before the work of transplanting begins. Transplanting can be done by hand or by a transplanting machine. Such a machine can only be used on level fields free from stumps, stones, or large quantities of undecomposed vegetable matter. By its use more satisfactory results are obtained, and large areas can be planted at much less expense than by hand planting. A transplanter is a two-wheeled machine, drawn by horses or mules. One man drives, while two boys drop the plants. Plants are set with mathematical regularity at any distance desired. The machine is so arranged that a supply of water is furnished at the time of planting, so that the plants are thoroughly watered while being placed in the soil. Machines of this character are widely used in the United States for setting out tobacco, cabbage, and tomato plants, with exceptionally good results. Machine-set plants start quicker and grow and mature more evenly than hand-set plants. In fig. 1 is shown the method of of transplanting tobacco plants by machine.[a]

In Sumatra, where all necessary operations are carried on by hand, the cooly is provided with a plant string the same length of the field. Each end of the string is securely attached to a stick of the same length that it is intended the rows shall be separated. This string is divided into intervals by means of colored string, to show the proper distance of the plants in the row. By means of a sharp stick, holes are made at the proper distance, about 10 centimeters deep and 7 centimeters in width. The holes are watered immediately before the plants are put in. The plants are pulled from the bed when the dew is still on them and set out late in the afternoon, when the rays of the sun are not very strong. During the daytime the pulled plants are kept in a basket and carefully watered and covered with cloth. About 4 o'clock in the afternoon the cooly drops from the basket a plant beside each hole and, when all of the plants are dropped, commences to plant. He holds the plant in the center of the hole with his left hand, and with his right hand presses the soil around the roots, carefully, but firmly, so that he can give the plant a slight pull without removing it.

As regards the number of plants to the hectare, this depends so largely on experience and the character of the soil and the kind of tobacco that special directions can not be given. Close planting in the row tends to develop a very thin leaf, while open planting allows the leaves to grow to a greater size and develops the gums and oils so common to tobacco. For cigar wrappers it is usual to plant closely in the row, in order that the leaves will shade each other and develop the fine, thin leaves desired for this purpose. In Sumatra as many as 10,000 plants are set out in a field of 1½ acres (slightly more than one-half of a hectare). For cigar fillers or for tobacco to be used for manufacturing purposes the planting is much more widely separated than in Sumatra.

As it is always desirable to get a uniform growth, great care should be exercised to have each plant live. Replanting should be done as quickly as it is possible to determine where fresh plants are needed. If the soil is moist and showers are frequent, watering the plants is unnecessary, but if the ground is dry they should be watered immediately after setting and each day thereafter as long as the plants require it. The quantity of water used is in all cases governed by the condition and nature of the soil. Usually after setting, the plants are undisturbed for a period of several days, during which time they are taking root. After this time cultivation should be begun and continued rapidly and frequently until further cultivation is liable to injure the growing leaves. Cultivation at first can be done by a light plow or hoe, but after the plants have reached a considerable height only the hoe should be used and this very lightly. At this period the leaves furnish sufficient shade to prevent the soil from baking and hindering the growth of the surface roots.

Every effort is made, both through fertilizing and cultivation, to maintain a steady and rapid growth, as any check in the rate of growth tends to thicken the leaf and reduce its elasticity. Stable manures are commonly used, while fertilizers known to be rich in potash are especially to be recommended. In many parts of the United States it is customary to apply specially prepared fertilizers after the plants have attained considerable size to still further stimulate the growth of the crop. In Sumatra the crop is given three cultivations. The second cultivation is made at the time the plants are about 30 centimeters high. Just before the second cultivation the cooly carefully removes the lower

[a] On file in the Bureau of Insular Affairs, War Department.

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leaves, places them around the stem, and packs the loose soil on these. At this second cultivation the suckers are broken off and buried in the same way as the leaves, so as to protect the stem. The work of topping and suckering varies considerably with reference to individual plants and the character of tobacco desired.

Early or low topping is not desirable, as it throws too much growth into the leaves, making them coarse and large. If the plants are thrifty and the weather favorable for growth, it is frequently advisable, if thin, fine-textured leaves are desired, not to top the plants at all, but let them produce their flowers and seed pods. If, however, the plants seem weak and it appears that they can not mature the full number of leaves, they should be topped by pinching out the "buttons," allowing to remain as many leaves as the plant will be able to mature. When plants have been topped too low and the leaves thicken and curl, a few suckers may be permitted to grow, which will remedy any thickening and curling. By using good judgment in the matter of topping and suckering and making proper allowance as to the soil and climatic conditions the leaves can be grown to almost any thickness that is desired.

From the time the plants begin to grow in the seed bed until they are harvested they should be examined carefully for worms, insect pests of all kinds, and all of the diseases which they are subject to. Worms may be removed by hand or by applications of mixtures containing poisonous substances, such as Paris green. For diseased plants frequently there is no other remedy than to remove the plant and reset other plants. But if the resetting is done too late the small plants never amount to much.

At the time of topping or when the buds have made their appearance a few plants are usually left for seed. Only the best, finest, and healthiest looking plants are selected for this purpose. These are allowed to grow and blossom at their full height. Sometimes all of the leaves are removed, but usually only the bottom leaves are taken off. When ripe the little balls containing the seed are carefully cut off with a knife or other sharp instrument. The cutting must be done carefully, so that the seed will not fall out. The seed pods are then spread out in the sun, and when thoroughly dried the seeds can be removed. The seed should be cleaned, preferably in a small seed mill and only the heaviest seed preserved for the next planting.

HARVESTING AND CURING.

More satisfactory results are obtained when the leaves are "primed" than when the entire is cut. By cutting the entire stalk much green tobacco is carried the shed, since all the leaves never ripen on the plant at the same time. By the system of priming the leaves are taken off the stalk as soon as they ripen and carried to the drying sheds in baskets. Sometimes half of the leaves are removed and the balance of the stalk cut and the leaves cured on the stalk. Tobacco should never be cut or primed when wet with rain or dew, as this causes the leaves to sunburn and little holes to form, which lowers the value of the leaf. If the tobacco gives promise of being "wrapper"—that is, if it is light green, very sound in leaf, and of desirable size—it should be primed at an early stage of ripening. If, however, appearances indicate that it will prove "filler" tobacco, it should be allowed to thoroughly ripen.

In the Cagayan Valley it is customary to make five gatherings of the ripened leaves at intervals of eight days. The native cuts the leaves while they are hot and drooping, collects them on his left arm until the bundle is too large, when it is placed on carts and hauled to the sheds.

The different primings should be kept separate in the shed, so that they can be fermented separately, as each set of leaves from different parts of the plant require different treatment in the subsequent fermentation.

If the soil is rich and the season favorable, a second profitable crop can be produced from the suckers. The first suckers, of course, should be broken off from time to time; otherwise they will sap, hinder, and check the growth of the leaves. When all of the leaves have been primed from the original stalk except four or six leaves at the top, two suckers should be allowed to grow from the bottom of the stalk. These will be well started by the time the top leaves of the original stalk are ripe. The stalk should then be cut just above where the suckers sprout, and cultivation should begin at once by carefully placing soil up around the old stubble. The suckers should not be allowed to have more than six or seven leaves each. The growth of these will be rapid and they will mature early. Usually these are not primed, but the stalks should be cut.

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In northern Luzon these mature in about three weeks and, in years of great humidity, a second crop of suckers is allowed to grow.

After harvesting the tobacco is carried to the sheds for drying and curing. These sheds are usually large enough to hold the crop from a number of small fields. Many different kinds of drying sheds are used, and differences of opinion prevail as to the relative merits of each style of shed. Some are broad and flat, others narrow and tall. The broad, flat type of barn is to be preferred, for the tobacco cures more slowly and better results are obtained. The interior of the shed is so constructed that frequent tiers of rafters and posts allow ample support for hanging the tobacco. The doors and windows should be with the idea of giving very thorough ventilation when open. The manipulation of the barn or curing shed is entirely governed by the condition of the weather and the nature of the tobacco, and no fixed rules can be given. Considerable care and judgment must be exercised in the curing of the crop, and as the conditions vary in each case from year to year, only experience can determine just what is to be done to meet the new problem in the curing shed. The process requires a few weeks, especially if the leaves have been primed. The crop is considered thoroughly cured when the midribs of the leaves are cured; it is then ready to be taken to the packing house for sorting, fermenting, and baling.

Very much of the value of tobacco depends upon the infinite care that is taken throughout the whole period of its production, and thorough consideration of all the details should be shown in the fermentation, grading, and sorting. The fermentation has two purposes. The first is to insure the proper texture, glossy appearance, and color to the leaf. It brings out the characteristic properties of the leaf, which are hardly apparent when the leaf is cut in the field. It is, furthermore, necessary to press the tobacco into bales, so that it can be shipped in compact form. The best results are obtained when bulk fermentation is practiced. In this method the leaves are assorted into piles, depending on what part of the stalk they have been taken from. Layer after layer of leaves are placed together, until piles of more than 1 meter are reached. The temperature in the pile gradually rises, and frequently thermometers are inserted to determine the exact degree of heat, which is never allowed to become excessive, or the tobacco will be injured. The piles are frequently turned over, to secure the proper heat and regulate the fermentation. No statement can be made as to how often the piles should be turned over, or when this should be done, as it depends upon the condition of the tobacco, especially as to how moist it was when placed in the pile. The leaves from the upper part of the stalk must be fermented more slowly than the lower leaves; consequently, the piles must be torn down and rebuilt more often. The principal fermentation is one before the sorting, as after the sorting there are so many grades which have to be kept separate. Often these different grades are refermented to improve the quality of the leaf.

In the Cagayan Valley the tobacco is placed into packs of 4 bundles of from 20 to 40 leaves. These bundles are then placed into bales of 80 packs. From 1 hectare an average yield for a number of years is 612 kilos of dry leaves. The tobacco is frequently assorted, with the following results: From 1 hectare, 10 packs of superior tobacco, 30 packs of first-class, 40 packs of second-class, 80 packs of third-class, 160 packs of fourth-class, and a number of packs of fifth-class tobacco. The sorting is generally carried on with reference to the colors, absence or presence of spots, length and soundness of leaf. Many divisions and subdivisions are made, according to market demands and the intended use of the tobacco. After the work of sorting and grading has been completed, it is baled into compact bales, when it is ready for shipment.

GROWING TOBACCO UNDER SHADE.

The growing of crops under shade is not a new idea, but was practiced perhaps hundreds of years ago; but the cultivation of fields of tobacco under a light cloth shelter of some character is comparatively recent. The idea of using shade started in the United States, in Florida, where in the last few years tobacco cultivation has made enormous advances. It was noticed that in new land, only partially cleared of the forest growth, the plants grown under the scattered trees were far superior to plants not so shaded. From this the idea of artificial shade had its birth, and now large fields, nearly 5 hectares in size, are grown under shade with great success.

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In addition to the experiments in Florida, many trials have been made in the State of Connecticut, with equal success. The character and quality of the tobacco was considerably modified and profits greatly increased. It was determined that tobacco fully equal to the finest Sumatra leaf could be grown in the Connecticut Valley on a commercial scale, and the experiments received widespread attention, and large companies have been formed to grow tobacco exclusively under shade. By using the shade the damage from insect pests is reduced to a minimum, the moisture content of the soils is increased, while the evaporation from the leaves is largely retained, favoring a more rapid and luxurious growth. The shelter tempers to some extent the intense heat of the sun and at the same time readily allows the free passage of even the slightest showers through it.

In figure 2 [a] is shown the general appearance of a tobacco field covered with a cheese-cloth shelter. The field contains about 4½ hectares and is one of a number of large fields of shaded tobacco grown in Florida in 1899. In figure 3 [a] is shown the details of the outside structure of the framework before the covering was put on. In figure 4 [a] is shown the details of the framework of a shade that was used in the Connecticut Valley in 1901. A strong framework is constructed of posts and stringers, that is further strengthened by strong wires secured at each end of the field by strong stakes driven well into the ground. This is covered with some light cloth, such as cheese cloth. By special request, an extra wide (about 5 meters) quality of cloth was made for the season of 1902. The cloth completely covers the framework and reaches to the ground, where it is secured. Gates are provided, covered with cloth, and, in the fields of large dimensions, it is advisable to leave a road lengthwise through the field. Usually the cloth must be renewed each season, but the framework is built sufficiently strong to last four or five years. The height of the framework is about 3 meters and the average total cost of the shade in the United States is about $350 United States currency, for 1 acre, 0.4 hectare. In the Philippines such a shelter could be constructed much more cheaply, on account of the cheapness of the framework, for bamboo and bejuco could be substituted largely for hard-wood posts and wire.

The covering completely incloses the field, and should be made so close that few, if any, insects can enter. The protection from strong winds is very beneficial, as the leaves are often torn and lashed when the crop is not protected. Much protection is also afforded from heavy, dashing rains, which would otherwise damage the leaves. The force of the heavy rainfall is broken and frequently the crop is saved when, without protection, it would be badly torn and damaged. So much better results have been accomplished in the United States with the shade-grown tobacco that an earnest plea is made for its introduction into the tobacco districts in the Philippines. Rumors have stated that the attempt is to be made in the Cagayan Valley, but the author can not state how far these experiments have been conducted, or what success has been attained. It will, of course, be advisable to experiment on a small scale, rather than expend any considerable amount of money on materials for shading large fields. A shade of sufficient size should be constructed to determine to what extent the crop will be benefited, and then plans can be made for the erection of larger coverings.

CONCLUSIONS.

From the above it is at once apparent that the successful cultivation of tobacco requires the greatest care and attention, from the preparation of the seed bed to the final fermentation and baling of the ripened leaves. While anyone unfamiliar with tobacco culture can probably produce a crop, it is to be doubted if it will be of such a character as to command a good price. Judgment, only to be gained through experience in growing the crop, is necessary at so many stages of the growth of the plant that it is doubtful if it is profitable for the planter to undertake its cultivation unless he can engage the services of some one who has had such experience. And yet it is possible for the careful planter, who persistently studies the requirements of the crop, in a very few years to produce tobacco of a quality superior to that grown in regions where its cultivation has been practiced for scores of years. When the Department of Agriculture attempted growing Sumatra tobacco under shade in the Connecticut Valley the idea was greatly ridiculed by conservative New England planters, who scoffed at the idea of trying to grow a new kind of tobacco. They main-

[a] These figures are on file in the Bureau of Insular Affairs, War Department.

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tained they had grown tobacco for years and knew the limitations of the soils and climate and the kind of tobacco best suited to the conditions. It took only one year to convince them that a new type of tobacco could be grown and sold for prices many times in advance of the best prices ever obtained for the finest of the old standard crop. And this has been the experience of tobacco cultivation the world over. Experiments have been tried in tobacco growing in new areas and in a few years, in many cases, have entirely revolutionized the agriculture in certain districts. New areas are constantly being opened up, with results that are very gratifying, even to the most sanguine experimenters.

In the districts where tobacco cultivation has been carried on for years no one should be contented with the results obtained, but should, by constant experimentation with new seed and improved cultivation, endeavor to improve the quality of the crop. Here in the Philippines it is commonly stated that the tobacco grown to-day is inferior to that formerly grown. This is greatly to be regretted, and it should be the especial effort of every planter to produce tobacco not only equal to that grown a few years ago, but far superior to the finest crops that were ever harvested. The tobacco markets of the world willingly pay, and pay well, too, for tobacco of a superior quality, whether it is to be used for cigars, cigarettes, or manufacturing purposes. The trade does not pay well for common tobacco, for anyone can grow coarse, common tobacco of low grade. The quality of the tobacco must be superior to that formerly grown to command a good price, for tobacco consumers are becoming more fastidious and constantly demand better goods for their money.

The author is of the opinion that the Philippine Islands can and should produce cigar-filler tobacco that is fully equal to the finest product of the famous Vuelta Abajo district of Cuba and a cigar wrapper equal to Sumatra tobacco. With careful attention to soil and climatic conditions, it is believed districts can be found that will raise tobacco similar in flavor and aroma to that grown in the best districts of Turkey. These results can only be obtained, however, by persistent, intelligent, well-directed efforts on the part of the planter.

Philippine tobacco to-day does not occupy the position it should, and every planter or company engaged in its cultivation should strive to place it on the high standard it deserves.

APPENDIX R.

REPORT BY INTERNAL-REVENUE AGENT BROWN ON THE TOBACCO SITUATION IN THE PROVINCES OF CAGAYAN AND ISABELA.

Manufacturers of cigars in these islands, dealers in the islands in native leaf tobacco, consumers in the islands of Manila cigars, manufacturers and merchants abroad who have handled in past years Philippine tobacco, consumers abroad of Manila cigars, and the Filipino, whether grower or tobacco merchant, all are of one mind on the tobacco situation. Philippine tobacco has gradually sunk to a deplorable level. Reports come from all sides that a Manila cigar is no longer the peer of the celebrated article produced in Cuba, the Habana cigar, and the tobacco of the Philippine Islands, which used to be prized all over the world, is now accepted with suspicion or in some cases is looked upon with indifference. Nature has most bountifully favored this country with rich and fertile lands and has given her products—hemp and tobacco—a high and distinguished place in the markets of the world. Hemp still stands in its high place, but the fragrant, fine, high-grade Philippine tobacco seems to be near the point of being termed a thing of the past. It is at low ebb, staggering and about to fall, and a report to-day on the situation should deal only with the causes which have led up to the lamentable state of affairs and what seems to be a remedy.

Tobacco is grown on both sides of the Rio Grande, and the lands cultivated begin at Alcala, Cagayan, and extend to Echague in the province of Isabela. This stretch of land varies in width from a few miles to perhaps 10 miles. It is not considered to be profitable to cultivate tobacco farther north than the point Alcala, as the effect of the sea breeze is felt. There is a small quantity, however, raised at Gattaran, but it is put to local uses solely. The farther south tobacco is grown the better its quality.

The tobacco lands of Cagayan are owned almost wholly by natives of the province, and in Isabela the area owned by them greatly exceeds that in the

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hands of Europeans. All of the lands owned by whites are situated in the province of Isabela, the Compañía General de Tabacos de Filipinas being the largest holder. The fact that the native owns the greater part of the tobacco land is an important one and bears on the situation directly.

The area of the lowlands, lands which are yearly flooded, on which tobacco is grown, greatly exceeds that of the highlands, or lands which border on those which are under water during the inundations. The lowlands which are so richly and generously replenished by nature through the floods produce the best tobacco and the native grower who cultivates tobacco on those lands starts off every season with all in his favor. On the highlands the European planters get good, first-class tobacco, but this the native rarely can obtain. The highlands by some planters are stripped bare of all timber, while other planters prefer to leave clusters of trees here and there throughout the plantation. The tobacco is a grateful plant and responds to every attention and the additional moisture brought to it by natural means as in the plantations in which trees are left standing shows itself in a slightly better quality of tobacco than that received from the land kept clean of everything. In virgin lands it is the custom to grow tobacco on one part one year, the following year on the next adjacent part, the third year on a more distant division, and on the fourth year again planting on the first part. Allowing the soil to rest and recuperate in this way, tobacco as fine in quality as that grown on the lowlands is obtained.

As the greater part of the tobacco area of Cagayan and Isabela is lowland its value for the cultivation of tobacco is to-day equal to what it was in the past.

In sowing tobacco in seed beds a fair amount of care is exercised by the native grower and in transplanting some attention is bestowed, but after that point the plant does not receive the treatment it needs. Weeding, freeing of the plant from the bug which will thrive on it if left alone, and other attention, are all done in a thoughtless and careless manner.

In place of harvesting his tobacco when the leaf is neither too green nor too ripe, the native grower cuts his plant without regard to the rules that were observed by his forefathers and which are bred in his bones. He simply cuts or gathers whenever it suits him, knowing that he can sell.

In the preparation and classification of the leaf the fancies of the native grower about the sale of his crop crowd out of his mind all thoughts about quality. In this respect he is free of care and worries not. It has been claimed that if the fermentation of the leaf is well and properly done it will result in a fine texture and general good appearing tobacco, but white growers assert that tobacco neglected in the fields can not by any process of fermentation be made to appear the same as the well-cared-for plant. Tobacco from the time of planting to the time it is put up in bales needs great care. In Cagayan and Isabela this is denied the plant by the native grower and the result is that all are forced to admit that Philippine tobacco is slowly and steadily falling in the estimation of those who for years have prized it. By their careless and neglectful methods of cultivation of tobacco in Cagayan and Isabela the natives are simply taking the bread out of their own mouths.

The transportation of tobacco from the farms to the warehouses of the buyers is to-day carried on in the same way as it was carried on in the days of the government monopoly, by carabao carts or by sledges. Before and after 1882 the growers at their expense made delivery to the buyer, but in late years this expense has been borne by the buyers. There is not much complaint of lack of roads, but of course good country roads all through the tobacco country would be a benefit both to the grower and buyer. Taking a bird's-eye view of the Cagayan Valley, one sees dotted near the banks of the Rio Grande, all the way up from Alcala, the storage warehouses of the tobacco buyers. The representatives of the Manila dealers in charge of these employ native "aforadores" on commission to buy for them, and out of the commission the "aforadores" provide transportation to the warehouse of the tobacco bought. Transportation facilities on the Rio Grande after the tobacco buying, August to December, are fairly good. The river is high at that season of the year, and large cascoes and barges are easily navigated. As Cagayan and Isabela tobacco goes through a curing process at Manila and is stored four or five years sometimes before being used in the factories, time is not a very important factor in the question of transportation of tobacco in the provinces where it is grown. From Alcala to Tuguegarao there is a fine, well-built road, and over every stream or gully a strong, well-constructed bridge has been put up.

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The following prices are paid for the transportation of tobacco on the Rio Grande in the provinces of Cagayan and Isabela:

Echague to Ilagan, about ₱0.80 per quintal; Ilagan to Aparri, about ₱0.53 per quintal; Tuguegarao to Aparri, about ₱0.40 per quintal, and by steamer from Aparri to Manila, about ₱0.35 per quintal.

It is not believed that the transportation facilities affect tobacco very greatly. Under the Spanish Government as much as 4 pesos were paid for the shipment of one bale from Aparri to Manila. Transportation is not the cause of the trouble.

The real causes of the situation should be laid at the doors of the native growers and the Chinese dealers in tobacco. The native at one time used to care for tobacco well and produced an article of good quality; to-day he is able to cultivate it as well as before, but does not do it. Up to 1882 the Filipino planters of Cagayan and Isabela grew tobacco at the muzzle of a gun. Every family was under the orders and supervision of a government employee, and the worker who disregarded the rules laid down for operations in the fields generally had administered to him a few smarting cuts with a bejuco. This slave driving resulted in first-class tobacco. The harsh restriction under which the native had cultivated tobacco having been withdrawn in 1882, the government monopoly no longer existing, notable reaction set in. From that date till to-day the methods which have been adopted and the results which have been obtained by the Filipino tobacco grower have been gradually sinking to a low standard. In 1900 the keen competition and the rush for the crops of Isabela and Cagayan and the high prices paid the planters have caused them to argue with themselves that it pays better to grow tobacco without regard to the best methods. From 1883 up to the present time there has been no restriction on the grower; he has been free in his fields, and the inferior quality of his product is the result. It has been shown that from the time of sowing seed he has been careless and neglectful, and therefore to the Filipino planter must be attributed the present state of affairs.

However, before leaving the part played by the native it should be stated that to produce better tobacco he must work hard, very hard, in his fields with his crop, and from the time of sowing in seed beds he must be unceasing in his attentions. Considering the enervating climate, the fact that tobacco raising requires the efforts of the planter for more than half the year, that the native thinks but little of to-morrow, it is not to be wondered at that he has preferred to let things swing their own way.

The other cause or evil of the situation is found in the Chinese merchant who deals in leaf tobacco. The Chinaman is one of the best business men in the world—the world admits that. The natives of the Philippines like dealing with the Chino. Amongst the semibarbarous Moros of Mindanao the Chino is found driving bargains, buying and selling. The Chinaman panders to the native and to attain his object in business is often groveling. He plays upon the native and feeds the native's craving for money, and if he is allowed to continue as he is doing in Cagayan and Isabela he will probably cripple in a dangerous and serious way the native planters as a body. The Chinese merchant handles tobacco simply as an article of commerce. It is true many of them know good tobacco, but their one object is money. If ₱5 profit can not be made by them on a bale, then 5 cents will suffice. In buying, the Chino visits the ranchos and offers money or merchandise for any class of tobacco, and if not ripe he will buy the leaf as it stands in the fields. Every year these Chinos get more native growers in their clutches, and that this is a real danger to the reputation of Cagayan and Isabela tobacco all agree. Among all the white buyers in the valley representing the Manila houses there is harmony, and competition can scarcely be said to exist. All have one object in view—to buy for their superiors in Manila good tobacco, paying therefor a good price. By all of these Europeans bad tobacco is rejected, but this plan is not adopted by the Chino. All is grist that comes to his mill. Tobacco good or bad to him means money. It can not be said that the Chino as a merchant is one who wishes something for nothing. His methods are in a business sense legitimate, but in another broader sense his operations are not fair. He himself produces no tobacco and is hurting greatly those who do produce.

The two causes, then, of the depreciated quality of Cagayan and Isabela tobacco, in the opinion of the undersigned, are the native grower, his slothfulness and callous indifference, and the Chinese merchant by his hoggish buying methods. If allowed to go hand in hand much longer, these two will prove a disease to the whole industry.

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To uplift the native grower it will not do to adopt harsh methods. Newspapers or other printed matter will not produce the desired results. The native respects authority, and subordinate officials in the provinces unless supported strongly by their superiors find difficulty in discharging important duties and achieving results, and it is respectfully suggested that the provincial governors be instructed to educate the native planters and that the provincial governors receive their direction and instructions from the honorable governor-general. In submitting this suggestion it is respectfully stated that in the middle of June, while passing through the tobacco country, it was specially noted that the feeling among the growers at Alcala, Amulung, and Iguig concerning the delay in the opening up of the buying of this season's crop by the large buyers of Manila almost approached alarm. This feeling was by no means openly displayed; the native, we well know, is stoical; but to one who understands his nature and who observes him on all occasions there was no doubt of the workings of his mind in this matter. This is a significant point. An American seeking information or light on a subject of high importance to the welfare of the Filipino from the native himself is not very successful; here is when the interest of a native provincial governor can be aroused.

The Manila manufacturers and dealers in leaf tobacco have united and agreed unanimously to reject all tobacco offered for sale by the growers which is not classified, and have agreed upon a tariff of prices. This is a step in the right direction and should bring the native growers to their senses and also should tend to counteract the methods of the Chinese dealer. The provisions of the internal-revenue law which require dealers in leaf tobacco to keep a proper record of their transactions are being enforced in Cayagan.

The efforts of all the white planters in the Cayagan Valley to improve the quality of tobacco are confined wholly to their own plantations. Under competent supervision tobacco is well cared for. They have confined themselves chiefly to discussions, to talks, and sympathizing one with the other; but lately prominent gentlemen of Manila, manufacturers, have put their heads together, and have resolved to reach the native growers with good sound advice and instruction on the culture of tobacco. As the tobacco lands are in greater part in the hands of natives, these exertions are praiseworthy. This fact of the greater part of the lands being in the hands of the native is also an argument in favor of steps being taken by the government through the provincial governors.

Before concluding this report it is deemed of importance to call attention to the demand which is growing all over the world for a light-colored cigar. The tobacco of the Philippines, grown in the open, is not suitable for light-colored cigars, but this should not be considered as a danger. The light-colored leaf is one which has been cut before it is ripe, and which has not been well cured. Sumatra is supplying this fine, silky, light-colored leaf, and is a competitor of the Philippines; but the supply is far short of the demand, and the press of the United States have undertaken to educate the smoker on this point. The Tobacco Leaf published the following on March 8, 1905, and again in May it was republished in the columns of the same paper:

"Probably there is not one smoker in a thousand who would not be surprised and in fact incredulous if he were told that the color of a cigar is absolutely no guide to its strength. Yet such is the case, and a fact well known to cigar manufacturers and importers. The belief of smokers that cigars of a dark color are strong and those of a lighter shade are milder is, in point of fact, as fallacious as it is general. This is but one of the many delusions harbored by consumers of tobacco, and which practical cigar men have smiled at and indulged from time immemorial.

"But of recent years the inclination of smokers toward light-hued cigars has assumed the proportions of a 'craze,' and the producers are finding much difficulty in meeting the demand. The manufacturers and Cuban raisers would now gladly correct their own error; but, after having carefully classified their products under the style of claros, colorados, maduros, etc., for decades, they find it next to impossible to dispel the illusion.

"A maker of Habana cigars uses but one grade or blend of tobacco in the body or filler of his cigars. Exactly the same stock is used in his conchas as in his perfectos; in his claros as in his maduros. After the cigars are made, however, his 'selector' takes them in hand and classifies them according to the relative shades of the wrappers. This is done to effect uniformity in the appearance of each box of cigars, and to enable the dealer to readily indulge the whims of the self-deluded smoker.

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"Inasmuch as the wrapper constitutes not more than one-tenth of the cigar, it will readily be seen that the degree of its strength or mildness is very inconsiderable in effect. In this connection, however, it is interesting to note that tobacco tradesmen versed in the intricacies of the industry rigidly bar the light-colored wrapper from their own smoking tables, knowing that it generally indicates that the leaf was prematurely cut and improperly cured, and that it impairs the flavor and burn of the cigar. Cubans, who, by the way, are notably partial to mild tobacco, avoid smoking light-colored cigars just as they avoid eating a green orange or an unripe banana.

"The prejudice of these natives or tobacco tradesmen is a logical one, and serves to throw into bold relief a peculiar misconception of facts, which is both amusing and embarrassing to venders of the fragrant weed.

"Whether cigar smokers will ever awaken to the fact that a dark cigar is, if anything, milder and invariably sweeter and more aromatic than a light cigar, remains to be seen."

However, light-colored leaf can be grown in the Philippines and is grown yearly in small quantities on the estate in the province of Isabela of one of the large Manila manufacturers by the shade culture process. The structure used in the plantation referred to is 3 meters in height and a covering of strong, fine canvas is used in place of cheese cloth or "coco crudo." Cheese cloth is not strong enough and the sun's rays penetrate, and "coco crudo" is not strong enough to resist the rain and wind storms.

The growing of tobacco under shade in the Philippines is expensive, and no attempt is made to produce large quantities. To produce 300 pounds costs ₱500, and the duty on 300 pounds in the United States amounts to ₱850. These expenses, put against the price being paid for fine, light-colored leaf in the United States, mean that shade-grown tobacco for export to America can not be cultivated with profit in the Philippine Islands.

APPENDIX S.

REPORT BY INTERNAL-REVENUE AGENT HOPE ON THE SALE OF LEAF TOBACCO AND THE MANUFACTURE OF CIGARS, CIGARETTES, SMOKING AND CHEWING TOBACCO, AND CHINESE SMOKING TOBACCO IN THE CITY OF MANILA.

LEAF-TOBACCO DEALERS.

The dealers in leaf tobacco are divided into two classes, i. e., the wholesale dealers and the wholesale and retail dealers, there being 8 of the former and 27 of the latter.

The wholesale dealers receive their tobacco direct from the growers in the provinces, principally of Isabela and Cagayan, and have large bodegas located close to the river and canals of the city where cascoes can be seen discharging their cargoes all the year round. Some of these dealers have from 2 to 6 bodegas, containing from 500 to 1,000 bales of leaf tobacco, which, with their customary trade, is stock enough to last from four to five years in case of an emergency.

The tobacco in all cases comes in bales called "bultos," the exterior being wrapped in dry cocoanut leaves and bound with rattan under heavy pressure. Considerable care is taken in the packing of this tobacco, which is done by Filipinos and Chinese, that packed by the Filipinos being distinguishable by its superiority, the leaves of which are spread out or arranged in plaits and stacked uniformly, and the bultos noted for their solidity. The same care is not taken by the Chinese in packing this tobacco, and as a consequence their bales are one-third and sometimes one-half as light as those packed by Filipinos, although the dimensions are the same.

The purchase of the higher grades of this tobacco is sometimes by the number of leaves of uniform size, but usually by the weight; the lower grades of this tobacco are sometimes purchased by the uniform size of the bultos, and whether packed by Filipinos or Chinese.

The tobacco when packed in the provinces is generally in a half-seasoned condition, partly damp, and it is for this reason, together with the fact that the longer it is kept the better and more flavored it becomes and increases correspondingly in value, that it is stored for long periods by dealers in their bodegas.

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On these bultos may be seen various marks denoting the province from which the tobacco was purchased, the class, and sometimes the weight, and the marks of the firms handling it, all of which are noted on the shipping invoice.

The average weight of these bultos is from 1 to 2½ quintals, and are arranged in classes as follows:

Isabela Province.

	Per quintal.	
First class, sold in city for	₱27.00 to	₱24.00
Second class, sold in city for	20.50 to	17.50
Third class, sold in city for	15.50 to	13.50
Fourth class (superior), sold in city for	12.50 to	10.50
Fourth class (corriente), sold in city for	8.00 to	7.00

Cagayan Province.

First class, sold in city for	₱20.00 to	₱17.00
Second class, sold in city for	15.00 to	12.50
Third class, sold in city for	12.00 to	10.00
Fourth class (superior), sold in city for	10.00 to	8.00
Fourth class (corriente), sold in city for	7.00 to	6.00

La Union Province.

First class, sold in city for	₱12.00 to	₱9.00
Second class, sold in city for	10.00 to	7.00
Third class, sold in city for	6.00 to	5.00
Fourth class, sold in city for	4.00 to	3.00

Barili, Cebu Province.

First class, sold in city for	₱12.00 to	₱10.00
Second class, sold in city for	10.00 to	8.00
Third class, sold in city for	8.00 to	7.00

There are other provinces that produce tobacco but of an inferior quality and which sells at a very low price, but, nevertheless, has a fair sale in the city, being used chiefly by mixing with higher grades.

Some of the larger cigar and cigarette factories are supplied by these wholesale dealers in leaf tobacco. Sometimes the tobacco changes hands two or three times among the retail dealers, and nearly all of them will sell any quantity from one-half a kilo up to any number of quintals, and invariably supply all the smaller factories.

In this industry, like many others in which the Chinese are interested, there are many schemes, those most favored by the retail dealers being to take the center out of a bulto and replace it with an inferior class of tobacco, or to remove two or more leaves out of each bulto and make up the weight with extra dry cocoanut leaves plaited in with the exterior cover. In some cases this is made impossible by having the bulto opened and every leaf examined, refusing to accept all doubtful and broken ones. In such cases, however, the Chinaman proceeds to make up for such vigilance on the part of the buyer by placing this refuse in the center of some other bulto and palming it off on some one who does not take the trouble to examine it.

As a class, these dealers are able to do a fair business and clear a profit of from 7 to 12 per cent, not including their schemes.

THE MANUFACTURE OF CIGARS.

Out of the 58 factories doing business in the city of Manila, 14 are owned by Europeans, 1 by an American negro, 24 by Filipinos, and 19 by Chinese. With the exception of one, who is solely an exporter, all make and sell cigars for local consumption in addition to what some of them export. All cigars made by these factories are from the Philippine leaf.

The leaf most used, especially for the higher grades of cigars, is that grown in the provinces of Cagayan and Isabela, of the first class, while that most used for the intermediate grade of cigars is that grown in the provinces of Cagayan and Isabela of the second and third class, and that most used for the low grade of cigars is sometimes a blend of the tobacco grown in the provinces of Cagayan and Isabela of the fourth class, together with tobacco from other

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provinces. Of course the value of the cigars manufactured varies according to the class of tobacco used and workmanship, the first class ranging in price from ₱50 to ₱250 per thousand, seldom higher; the second class from ₱20 to ₱50 per thousand, and the third class from ₱10 to ₱20 per thousand.

Some manufacturers claim that no two crops of tobacco yield the same quality, and that only one crop in four yields a superior quality of tobacco, and that in recent years the quality has decreased. However, notwithstanding all these drawbacks, there is always a good market for these crops, which are eagerly sought for.

The percentage of tobacco used for wrappers and filling varies with each class. A conservative estimate for high-grade wrappers would be from 8 to 12 per cent, with the next grade from 12 to 20 per cent, and with some factories up to 25 per cent. This would include all first-class tobacco. Fillings for this class run from 60 to 70 per cent. Second-class wrappers average from 15 to 20 per cent, and fillings from 35 to 45 per cent. Third-class wrappers average about 10 per cent, and fillings about 15 per cent. From the last two classes of tobacco most of the lower grades of cigars are made. In many cases the fourth-class tobacco is mixed with other tobacco, usually Londres and Nueva Habana of inferior grade, and is handled mostly by the smaller factories.

The actual waste of a cigar factory, i. e., the stems of the leaves, is approximately 22 per cent; the cuttings of large factories are either sold for exportation to Hongkong and Shanghai, or to cigarette manufacturers, who are always ready to buy them. In the case of smaller cigar factories these cuttings are broken up and used over again.

The tobacco stems are sold to some Chinamen for a very small sum, in fact many factories are only too glad to have them taken away for nothing. These stems are used by the Chinamen in making a wash for polishing furniture and marble by burning the stems in a furnace especially provided for that purpose, and the ashes placed in large earthen filters. A certain amount of water is then added, which, when it has passed through the filters, is immediately caught in barrels underneath, placed in boilers and allowed to boil slowly for a day or two, after which it is considered ready for use, packed in coal-oil cans and sold for ₱2 per can.

Manila does not possess a single cigar machine, although some time back one of the larger factories bought two of European design for experimental purposes. The result, however, proved so poor that the idea was abandoned, the machines dismantled, and portions used for other purposes. All the cigars in the city of Manila are Filipino handmade, which gives employment to many thousands, both male and female, ranging from 10 to 60 years of age. Many manufacturers differ in opinion as to which of the sexes is more satisfactory in the manufacture of cigars, but if there is any preference it rests with the males.

The average factory working day is from ten to twelve hours, excepting Sundays and holidays, when, if work is done, the pay is doubled.

The cigar workers are arranged in classes for the preparation of the leaf, such as stripping, etc., which is always done by hand, cutting wrappers to uniform size and stacking them ready for work. One section can be seen with piles of tobacco leaf in front of them, cut to about the size of a silver peso, rolling cigars, others putting on tin foil, packing in boxes and pasting on labels, etc. These workers are paid by the piece. A good cigar maker of high-grade cigars can make from 100 to 150 per day, of low-grade cigars from 150 to 300 per day, and an exceptionally good cigar maker can make 350 cigars per day. There are very few, however, that can make 350 cigars per day. The pay of these workers averages from ₱5 to ₱18 per thousand. The best cigar maker seldom exceeds the latter amount.

The comparatively small stock kept on hand by most of the small factories is due to the worm which attacks the cigar after its manufacture. In some cases the cigar is attacked by this worm within three months after its manufacture, and in other cases seems to escape up until nine months, but seldom escapes beyond that period.

The cigar boxes used by the factories are either secured locally or imported, only one factory possessing a machine for their manufacture. All local purchases are made from Chinos, who make them by hand and sell them for from ₱14 to ₱18 per thousand boxes. Some manufacturers claim that the imported box from Germany can be secured for about half the local price after paying all expenses of importation.

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THE MANUFACTURE OF CIGARETTES.

There are 50 cigarette factories in the city of Manila, 11 of which are owned by Europeans, 14 by Filipinos, and 25 by Chinese. Twenty-eight of these factories have their own cutting machines, and all, with the exception of 7, have their own cigarette machines.

There are two classes of cigarettes, machine and handmade, the former predominating. The tobacco used includes all classes and the classes mixed vary with every factory, in some instances being considered as a secret.

The following is the formula used for one mixture:

	Kilos.
Fourth-class tobacco, Isabela Province	322
Fourth-class tobacco, Cagayan Province	115
First-class tobacco, La Union Province	138
Second-class tobacco, La Union Province	138
Third-class tobacco, La Union Province	138
First-class tobacco, Barili, Cebu Province	92
Second-class tobacco, Barili, Cebu Province	69
Total	1,012

Even this mixture of low-class tobacco is able to command a fair market and sells from ₱40 to ₱45 per thousand packages (cajetillas) of 30 cigarettes to each package. The selling price of the factories for cigarettes made of the above-sized cajetillas is from ₱39 to ₱76 per thousand packages.

There is very little preparation required for tobacco which is to be cut for cigarettes. The stems of the leaves are seldom separated but are chopped up with the tobacco. The tobacco is taken from the bulto in piles ranging from 20 to 30 leaves at a time, the stems of which are dipped in water to about 6 inches and thrown aside for a day or so. This allows the whole leaf to moisten, which prevents its going into powder when thrown into the cutting machine, which would happen were it cut in its dry, crisp state.

The machines used for cutting this tobacco in this city are mostly of French pattern, with either steam or electric power, and cut at the rate of 380 kilos per hour. This tobacco when cut is called "picadura."

The picadura, before being made into cigarettes, has to be thoroughly dried and cleaned. The drying is in most cases done on the roofs of the factories, or any open space where it will have the benefit of the rays of the sun. With some of the larger factories this drying is done by machinery. The tobacco is then cleaned, sometimes by steam power, but mostly by hand, which is a process of separating the fine powder or dust from the tobacco, which is then ready for use.

There are three classes of cigarette machines, i. e., "La Favorita" and "Usines Decuefle," both French machines, and "The Bunsach," an American machine. "La Favorita," although the slowest one of the three, is the one most used. In working this machine one hand is required to arrange the picadura regularly in the feeder, which holds usually about 2 kilos of tobacco, and to lookout for the fouling of cigarette papers, which constantly happens. The papers used with this machine are fastened with paste or gum. The capacity is generally from 30 to 32 cigarettes per minute. This machine is adaptable for either steam, electricity, or hand power.

The "Usines Decuefle" machine is an improvement over the "La Favorita" in that it has a capacity of from 60 to 70 cigarettes per minute. There are two kinds of this machine, one which fastens the cigarette paper with either paste or gum and the other by a crimp. In other respects these machines are much the same as "La Favorita."

"The Bunsach" machine, like the French machines, requires but one attendant. The tobacco is thrown into the feeder, which is a large square box, sometimes tapering off at the bottom, in large quantities. This tobacco, in process, passes through the machine and comes out at the bottom rolled in a long continuous string and accompanied with the cigarette paper, which is run off from a reel, passes through another part of the machine which fastens the paper with a crimp and cuts off the cigarette at the rate of 250 per minute.

The advantage of the French machines over the American is that they tuck in one end of the cigarette, which is much desired. The disadvantages are that they can not, with safety, use up the coarse grains of tobacco which are usually sifted out from the long, stringy picadura in cleaning. Although there is always

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a small proportion of these coarse grains that become mixed up with the tobacco or picadura, this, in the process of manufacture, generally falls through the machine and is caught in a vessel placed immediately under the machine for that purpose. There is still, however, one way by which these coarse grains can be used with these machines, although very few care to take advantage of it. When the long arm of the feeder is packed, these coarse grains may be sprinkled on the top, usually in the center, and thus carried into the manufacture of the cigarette. The one objection to this is that by tapping the cigarette with the open end held downward, or by pulling out one or two of the long stringly threads of picadura, half the contents of the cigarette will fall out and render the cigarette useless.

The advantage of the American machine is its ability to dispose of the smaller grains of tobacco, and its rapidity. These grains are mixed up with the picadura and thrown into the feeder and come out of the machine rolled firmly in the cigarette.

The percentage of the cigarettes that run foul with the French and American machines is from 10 to 15 per cent. These are called "desechos" and are broken up and reused.

Many of the factories have cigarettes made by hand in addition to those made by machine. In the former method a large proportion of the tobacco which is not used with the machine can be disposed of. These cigarettes are divided into two classes, one of which is made of the same class of tobacco as is used with the machines, having about 10 per cent of machine refuse mixed in, the paper fastened with paste, and, in some cases, having one end tucked in, but in most cases both ends left open. From 300 to 350 cigarettes of this class can be made by one person in an hour. The other class of handmade cigarettes is made of all coarse grain, usually all refuse tobacco from the machines. The paper in this class of cigarettes is not fastened, but left open, having both ends tucked in. These cigarettes are made at the rate of from 450 to 500 per hour. All handmade cigarettes are made exclusively by females.

The actual waste of tobacco in a cigarette factory depends on the sort of tobacco used. In the higher grades and with the wide leaf there is very little wasted; with the lower grades and smaller leaf there is more wasted. A great deal depends on the way the tobacco is handled—much transporting, repacking, etc., will naturally break the picadura up and turn it into powder. The loss of a cigarette factory is from 3 per cent and ought not to exceed 8 per cent. By the actual loss I mean the powder that has gone through the fine sieves—that which can not be used in the manufacture of any kind of cigarettes or smoking or chewing tobacco. This powder is sold to farmers for fertilizing purposes and insect killing, the only use it can be put to.

The manufacture of cigarettes, like the manufacture of cigars, employs some thousands of laborers, two-thirds of whom are females. Every factory has a workshop in which one or more machinists are employed, receiving salaries from ₱50 to ₱100 per month. The attendants at the cigarette machines are paid from ₱0.70 to ₱1 per day for day and night work, respectively. All the rest of the help are paid by piecework. The wrapping is mostly done by women, one person usually wrapping from 100 to 120 packages in an hour and is paid from ₱0.50 to ₱0.60 per 1,000 cajetillas. All labor on Sundays and holidays demand double pay, while night work demands an increase of one-third.

The working hours of most factories are unfixed, and all depends on what trade they do. Some of them are at work day and night, while others work from sixteen, twenty, to twenty-two hours daily.

The average number of cigarettes in 2 kilos of tobacco differs with many factories—from 700 to 900 with the large size and from 1,000 to 1,900 with the small size.

The keenest competition is always shown in this line of business; old firms and old brands in some cases don't figure much. I have known of some of the factories to be doing an increasing business month after month, then all at once the trade would fall away to almost half, sometimes less, and continue so for a time, when it would pick up again. This is the case with a majority of them, although the general business is steadily on the increase. No explanation for this can be given by any of them.

One complaint I often hear from these manufacturers is the practice of one manufacturer imitating the other's wrappers, as follows:

A's trade is bad; he finds that B's trade is exceptionally good on a certain brand of cigarettes which is selling for say ₱50 per 1,000 cajetillas. A will have

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his lithographer make him B's wrappers as nearly identical as possible without overstepping the law, if by chance B has his patent registered. A will then canvass the dealers, generally Chinos, and offer this imitation, which is usually inferior tobacco, for, say, ₱45 per 1,000 cajetillas. If the dealer accepts, which he rarely fails to do, he will await his "marks," who are principally provincial people who can not read, and when they ask for B's brand he will hand them A's imitation brand, charging the same price he would for B's genuine cigarettes. The customer, knowing the pictures on B's brand and being unable to read, accepts, and the dealer not only makes his usual profit of ₱1 on the 1,000. or the value of the wooden box in which the cigarettes came, which is in many cases the only profit made, but he will also make the difference in the factory price in addition to the ordinary profit, thereby ruining the reputation of B's cigarettes. For this reason some factories have affixed a notice on their original packages cautioning their customers to guard against this practice.

THE MANUFACTURE OF SMOKING TOBACCO.

The tobacco used for this purpose is prepared in the same manner as that used in the manufacture of cigarettes, with the exception that it is not thoroughly dried and is known commercially as "picadura."

The packages are usually made by hand and are put up mostly in rectangular shape, weighing 200, 250, and 500 grams.

The factory's price depends on the grade of tobacco used. The package weighing 250 grams is the one mostly used, and, on the whole, is made from a fairly good grade of tobacco. This tobacco is sold by the factories for from ₱18 to ₱20 per 100 packages and by the retailer for ₱0.20 per package.

The apparatus chiefly used for packing is a wooden box of the required size, built on a stool on which the worker sits straddle, having the paper folded to size with one end open. This is placed in the box and the tobacco pounded in with a maul. The tobacco being generally damp, and seldom weighed out, accounts for the slight difference in the weight of each package.

In this class of tobacco can be and is generally used all refuse from cigarette machines, which is usually a good class of tobacco. This is mixed to the proportion of one-third to one-fourth with the long, stringy, machine-cut tobacco. On account of the grade and refuse used it requires more cleaning and, as a consequence, has a larger per cent of waste than the cigarette factory, the same being from 10 to 20 per cent.

This industry has a good market in the city of Manila and is bought up principally by the poorer classes for cigarette making for their own consumption.

THE MANUFACTURE OF CHEWING TOBACCO.

Chewing tobacco is made from the best class of tobacco and, like in the manufacture of cigars, the stems are separated, which is the only waste.

The leaves of the tobacco for this purpose are heavily sprinkled with water, pounded out on a board, and rolled up into pieces something like cigars. These pieces, when completed, are so saturated with water that you can squeeze the juice out of them with the thumb and forefinger. They are considered usable so long as they keep moist, after which time they have to be remade. They are put up in packages either of 10 or 100 pieces, the former being mostly in use, and weighing 100 grams to the package, which is sold for ₱1.85 per kilo or 10 packages.

This tobacco is exclusively used by Filipinos, who chew it with betel nut.

Chewing tobacco, after the American style, is not made in this city.

THE MANUFACTURE OF CHINESE SMOKING TOBACCO.

There are nine of these factories in this city, eight of which manufacture from the Philippine and one from the imported leaf. The imported leaf is known as the red and the yellow leaf.

The process of manufacture is the same with all the leaves, which is as follows:

The tobacco is prepared in the same way as in the manufacture of cigars, the stems being the only portion wasted. The leaves are soaked in oil, folded, and stacked in layers. They are then placed in a machine, under heavy pressure, and the greater part of the oil squeezed out, which leaves the tobacco in a

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solid block. This is allowed to stand for a day or so, when it is bound with ropes and is ready for cutting. This is done by a worker who straddles the block and shaves the tobacco off with a plane.

The imported leaf is usually mixed with the Philippine leaf, and when shaved off is of a yellow color, while that which is all from the Philippine leaf is of a dark brown color.

Considerable care is taken in the shaving off of this tobacco, which is done slowly and in small pieces, and neatly arranged in layers on small trays. It is then placed in an oven for drying out before it is wrapped into packages. That mixed with the Chinese leaf tobacco is put up into flat, square packages of 296 grams and is sold for ₱1.50 per package. The other is put up in various sized packages of 77, 83, and 175 grams, and is sold for 10, 15, and 25 centavos per package.

A considerable quantity of the Chinese tobacco is imported already manufactured and is almost identical in every respect with that made in this city. This tobacco is largely used in Manila and can be found on sale in every Chinese retail tobacco store.

APPENDIX T.

REPORT OF PROVINCIAL TREASURER GOODHART ON MANUFACTURE OF CIGARS, CIGARETTES, AND SMOKING AND CHEWING TOBACCO IN THE PROVINCE OF BULACÁN.

The records of this office show that the manufacturers of this province have been very prosperous under the present law; in fact, the production of cigarettes for 1905, taking the reports of the past five months as a basis of calculation, will exceed the output for 1904 by about 20,000,000 cigarettes. As per bonds and official statements of manufacturers, only 43,438,000 cigarettes were produced in 1904, while the production for 1905, taking the reports of the past five months as a basis of calculation, will reach 62,125,860.

The increase in the output of cigars has been still greater, that for 1904 being 22,300, while the computed output for 1905 is 141,118.

In 1904 2,880 kilos of smoking and chewing tobacco were manufactured. For 1905, calculating on the same basis, the output will be only 1,841 kilos, or a loss of over 1,000 kilos.

I have visited almost all the factories and talked with the owners concerning the internal-revenue law, and found them all agreeing that the demand for their products has been greatly increased, and of the opinion that the new law has been beneficial to the business.

In some cases the sales have been double, and in one factory are three times as great, notwithstanding the fact that they ask 4 centavos for a package of cigarettes formerly costing 2 centavos, and on which the tax is only 1⅝ centavos.

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COFFEE IN THE PHILIPPINES.

[From Report of the Schurman Philippine Commission, 1900, vol. 3, p. 269.]

This valuable fruit was brought to the Philippine Archipelago by the Spanish missionaries toward the end of the eighteenth century, and was first cultivated in the province of Laguna. It was afterwards naturally propagated easily and rapidly by a little mammal (*Paradoxurus musanga* L.), which fed upon the berries. Afterwards its cultivation fell to the lowest ebb, in spite of premiums offered to cultivators. At the present time, due to the increased price of coffee and better facilities for exporting, its production has begun to increase.

Although there are many different species of the genus *Coffea*, but 4 constitute the coffee of commerce. They are—*Coffea arabica*, or common coffee; *Coffea racemosa*, or Peruvian coffee, very similar to the preceding; *Coffea laurina*, or African coffee, and *Coffea liberica*, or Liberian coffee, a more robust plant, which has larger leaves than the common coffee plant. Almost all of the varieties cultivated come from the first species, which is the one requiring most heat. In the Philippines the provinces producing most coffee are Batangas, Laguna, Tayabas, and Cavite in Luzon, and the districts of Cotabato and Misamis in Mindanao.

Coffee requires a climate whose average temperature ranges between 16° and 24° C., and therefore next to sugar cane is the plant requiring the greatest amount of heat. In localities having both heat and moisture its growth is stronger and more luxuriant, as is manifested in various ways. In very hot climates the coffee plant grows well but should have the shade of some other suitable tree, whereas in cooler climates it thrives best without this protection. The soil most suitable for its cultivation is that which is light and moist but not marshy. Reddish soils somewhat sandy, or black soils without too much clay, are suitable for its cultivation.

If the land is virgin soil it should be thoroughly cleared, plowed deeply two or three times, and then harrowed, and if old land, it should be well fertilized.

Planting can be carried on in various ways. The best are by means of hotbeds and by transplanting. These hotbeds or nurseries are made in well-shaded soil, which should be clean, well worked, and thoroughly fertilized. The seed should be ripe and fresh, and not taken from the fleshy covering. Transplanting is done when the plants have three or four roots, care being taken not to injure the delicate stem, although a part of the central root is cut off at the moment of transplanting. Plants which have reached a height of 40 or 50 centimeters may be used by cutting off the upper part of the stem and likewise the vertical root, stamping down the earth about them, and immediately watering. The ground where this transplanting is made should be previously prepared, holes being made in parallel lines running north and south and having a distance of 8 feet from each other. The land should afterwards be kept clean, and other trees should be planted for their shade. The tree usually employed in the Philippines for this purpose is called madre cacao (*Gadedupa pungam* Bl.), but there are many who advocate the use of the balibago (*Hibiscus tiliaceus* L.) as giving better protection to the plantations and being more productive. Experience demonstrates that the pruning of coffee trees prejudices the production, as the plant, growing naturally with favorable rains produces at the end of six or seven years an average of 5 kilograms of berries for each one, while those which have been pruned do not produce one-fourth as much.

The gathering is accomplished either by shaking, if the plants are high, or by hand picking, if they are low. After gathering, the pericarpium is removed, an operation easily accomplished by hand, and the berries are placed in the sun, care being taken to separate those collected on various days. When the berries are thoroughly dried the husk is removed by means of a mill or other apparatus. The other operations necessary to prepare coffee for the market are winnowing, to separate the inner husk and all dirt from the berry, and sorting into first and second grades.

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The coffee plant begins to produce in from three to five years—according to climate, soil, and cultivation—is in full bearing in six or seven years, and continues to be productive for thirty years if no accident happens. Philippine coffee compares well with that of Java or Martinique, but there are certain localities which produce coffee which, according to experts, can be compared only to that of Mocha.

From former times the production of coffee in the Philippines has fallen off greatly, on account of the destruction of the plants by an insect of the genus *Xylotrechus* and by a fungus of the genus *Peronospora*.

[From report of the Secretary of the Interior to the Philippine Commission for the year ending August 31, 1902, p. 303.]

An especially fine coffee is grown in the mountain regions of Benguet and Bontoc and in the province of Lepanto. The bushes yield heavy crops, and the unhulled coffee at present sells readily at Manila at $35 Mexican per cavan for consumption in these islands or for shipment to Spain. There is no region in the United States which has a more healthful or delightful climate than is afforded by the Benguet highlands, where a white man can perform heavy field labor without excessive fatigue or injury to his health.

[From report by Oswald A. Steven, Philippine Commission Report, November 1, 1902, p. 633.]

Coffee can be grown on most of the islands of the group where there are timbered gulches or ravines and up to an elevation of 2,000 feet. Coffee in these islands lately had a setback from a scale. The native grower "dropped it," but the manager of a modern farm will be able to rid himself of the scale, but must have the right location to grow the coffee.

After an education in this commodity, it is only a question of time when coffee can be a large export, for the soil, climate, and conditions are just suited to it. The most expensive part of the raising of coffee is the labor, and here in the Philippine Islands this item is reduced to a minimum.

The machinery required for the proper marketing of coffee is so simple and cheap that it figures very little in the expense, and even the poorer natives here could raise and market a choice coffee if shown how. The principal and most important part in the whole process is the grading or classing of the berry, but it is essential that high elevations be secured for best results.

[Extracts from the Report of the Philippine Commission, 1903, part 2, p. 50.]

EXPERIMENTS IN GROWING COFFEE.

As I have heretofore stated the coffee plantations of Batangas, which were formerly such a source of revenue to the inhabitants, have completely disappeared as a result of the ravages of borers and of the leaf blight. A tract of good coffee land in this province has been secured by the bureau of agriculture, which hopes to rehabilitate the coffee industry in Batangas, by demonstrating that immunity from disease and insect pests may be obtained by the selection of vigorous varieties of coffee and the adoption of the best systems of cultivation and treatment. Some time must elapse before the practical value of the experiments, which it is proposed to undertake, can be demonstrated.

[Page 644.]

COFFEE PLANTATION.

Through the public spirit of Señor Sixto Roxas, of Lipa, a tract of land about 10 acres has been secured for the use of the bureau for a term of years for the purpose of making experiments in the cultivation of coffee. Señor Roxas has agreed to provide the necessary unskilled labor for carrying on the work, which shall be under the immediate direction of an agent of this bureau familiar with coffee culture. Prior to 1891 there were in Batangas Province extensive coffee plantations, covering thousands of hectares of land, which yielded large incomes to their owners. Since that period the history of these plantations has been but a repetition of that of all coffee-growing countries in the Orient—almost total destruction by attacks of leaf blight and borers. The soil and other conditions of the province are undoubtedly unsurpassed for coffee

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growing, as evidenced by the product of former years, and it is the purpose of this bureau to secure immunity from disease and insect pests by the selection of vigorous growing varieties and the adoption of the best system of cultivation and treatment.

[Report of William S. Lyon, in charge of division of plant industry, bureau of agriculture, in Report of the Philippine Commission for 1903, part 2, p. 700.]

DISEASE-RESISTANT COFFEE.

Particular interest attaches to an importation of new coffee seed into the islands, and the final outcome of the experimental plantings at Lipa, in Batangas Province, under the bureau's direct control, will probably have a strong bearing on the future of this great industry in the Philippines. The circumstances leading up to the inception of this planting enterprise were the outgrowth of petitions addressed to this bureau requesting that efforts be made to reestablish this once dominant industry, and, in conformity with the wishes of our correspondents, a careful inspection was made of the once largely planted central Batangas plateau, and, as offering conditions typical for a large area, a selection of trial grounds for coffee was made in the town of Lipa.

Through the public spirit and enterprise of Señor Sixto Roxas, of Lipa, a tract of about 10 acres was placed by him at the disposal of the bureau for a term of years, the tenure of which was to extend over the necessary duration of the experiment. The same gentleman has provided the unskilled labor to carry on necessary field operations, while the bureau's contribution to the same end covers seeds, tools, and general supervision and direction of the work.

It is unnecessary here to give more than a superficial sketch of the conditions which existed in south central Luzon prior to 1891. Until that time extensive coffee plantations, covering thousands of hectares of land, abounded everywhere in the central part of Batangas Province; and that the production of coffee was enormously profitable is testified to not only by living planters, but by the mute evidences of decadent wealth still visible in the then coffee-growing centers. From that time its history has been only a repetition of that of all coffee-growing countries in the Orient invaded by the leaf-spot fungus and root borer. In less than three years from the invasion of the disease the plantations were practically wiped out of existence. The variety grown was exclusively the Arabian berry, and natural conditions were exceptionally suitable for the best development of the plant as well as of fruit of peculiar excellence.

It is to-day quite out of the question to secure from any locality in Batangas Province enough fruit to ascertain what its maximum of excellence would be if submitted to the manipulations practiced on a modern Javanese coffee estate. Its past history gives assurance of a product so superior that it would be beyond competition with the coffees of Brazil, which now flood the markets of the world. This excellence was in a large measure due to the natural conditions which would prove equally beneficial in improving the quality of some of the more robust growing kinds.

To this end an importation of seed was made, and a large number of plants reared, of the Liberian and Maragogype hybrid, and these have been successfully transplanted and are now growing on the land selected in Lipa for this purpose. The entire plantation was plowed, cross-plowed, and harrowed. As it showed by test some soil acidity, one-half was top-dressed with lime at the rate of 1,000 kilos per hectare, the land lined out in two directions, and holes dug having a width and depth of 60 centimeters, the soil left exposed to atmospheric influences for two weeks, and the trees planted—the Maragogype at 4 meters and the Liberian at 4½ meters equidistant. The soil of the plantation is generally shallow, but of excellent quality, while the subsoil—a soft, crumbling rock—is freely permeable to both water and plant roots. An intercalary crop of corn is now maturing on the land and is to be followed by a rotation of sesamum or cotton. Plantings for shade have been dispensed with, the elevation (300 meters) and the vigor of the varieties selected being deemed sufficient to justify this departure from usual practices here, as elsewhere.

Very great dependence is placed upon the virtues of frequent and thorough cultivation, and, to effect this with the most lasting benefit, wide planting and the introduction of hoed crops for the first three years will be resorted to. While it is designed that this shall be the general treatment accorded to the whole plantation, portions have been marked off that will be subjected to more intense cultivation, to prophylactic sprayings, and to the systematic application of manures, pruning, etc. Records of outlay covering both methods are being

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kept, by which it is expected that a balance sheet may be struck that will determine the practical commercial value attaching to each method.

The presence of a number of old scattered trees in the old plantations, unaffected in stem or root, indicates that the coffee borer has followed the course of many insect scourges, and, if it has not disappeared, it has at least abated for want of abundant material on which to thrive. A close watch will be kept and, should it reappear, systematic efforts will be made to stamp it out. La Mancha (*Hemileia*) is still in ample evidence, but it is hoped that one or both of the reputedly resistant varieties mentioned above may withstand its attacks. That there is any resistance that amounts to immunity is very doubtful, but it has been fully demonstrated that maintenance of the plant at all times in a good growing condition is most strongly conducive to immunity.

The coffee trees of Batangas succumbed to disease under a treatment of nearly absolute neglect. The present experiment contemplates continuous high-pressure tillage. General reliance, nevertheless, will be placed upon the alleged power of resistance of the varieties under observation, supplemented by such cultural treatment as will at all times guarantee the vigor and health of tissue so unfavorable to the propagation of parasitic diseases.

[From Report of the Philippine Commission, 1904, part 1, p. 400.]

CULTIVATION OF COFFEE.

Cocoa and coffee grow well in all of the pueblos of the province. The cocoa of Barbaza, known commercially as "Antique cocoa," is much sought after and brings a high price in the market of Iloilo; however, the production of these two articles is scarcely sufficient to satisfy local consumption at present. I have greatly wondered why it is that cocoa and coffee being of a quality superior to that of Lipa, they are not grown in quantities sufficient for export. This is a problem which I shall submit to the consideration of the municipal officers, and try to get them interested in encouraging the people of their respective pueblos to take up this very profitable business.

[From Report of the Philippine Commission, 1904, part 1, p. 411.]

Two years ago all the native officials and the Igorot chiefs were instructed to advise their people to plant coffee, with the result that now, in every barrio in Benguet, there are young coffee trees which will soon begin to bear, and as a consequence Benguet will take a prominent if not a fore place in the archipelago in the production of coffee.

[From Report of the Philippine Commission, 1904, part 1, p. 446.]

The gently rolling tableland just to the south of the level rice lands is admirably adapted to the cultivation of sugar. In former times, when sugar could be raised at a profit, its cultivation was one of the main industries of the province. There are many cane mills in the province, the motive power in most cases being the swiftly flowing streams from the mountains. Many of these mills are now in a dilapidated condition, but some are in active operation. The southern part of the province is closely wooded, with many scattered fields devoted to the cultivation of mountain rice, corn, and various vegetables. Formerly this section produced much coffee, and the coffee towns were the richest of the province. For several years past, however, the coffee trees have been afflicted with a scale or blight that in large part has destroyed the fruit-bearing power of the tree. Some coffee is still raised, but not enough to be of material consequence. The trees are still standing, and the crop last year was greater than that of the year before, making the owners entertain hopes that the trees may in time regain their productiveness. I have corresponded with the agricultural bureau on the subject, but their reply seems to indicate that as yet there is no known remedy that will kill the blight without at the same time killing the tree.

[From Report of the Philippine Commission, 1906, vol. 2, p. 43.]

INTRODUCTION OF A COFFEE WHICH RESISTS BLIGHT.

Three years ago a plantation of the variety of Brazilian coffee known as the Maragogype hybrid was started at Lipa, in the province of Batangas, with a view to determining the possibility of reestablishing the once important coffee

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industry of that province, which had been ruined by borers and by the coffee blight known as Hemileia. The bushes on this plantation are now fruiting heavily and show no signs of infection with Hemileia, although Arabian Coffee bushes in the same neighborhood are badly affected and Hemileia has attacked practically all of the mountain plantations in Benguet and Lepanto-Bontoc.

It has been claimed that this Brazilian variety is lacking in productiveness, but 3-year-old bushes at Lipa and Manila are producing one-third of a pound each per year. Hemileia at one time practically ruined the coffee industry of Java, but it was reestablished by planting robust varieties which resisted the blight. It is confidently anticipated that the same thing may be done here, and present indications are that the variety above named will solve the problem.

[From Report of the Philippine Commission, 1906, vol. 2, p. 168.]

The plantation of Brazilian coffee, known as the Maragogype hybrid, made at Lipa three years ago, is fruiting heavily, and so far showing no signs of the Hemileia, the disease that destroyed the once prosperous coffee industry of Batangas. Arabian coffee in the same neighborhood is badly affected. This Brazilian hybrid is criticised as being lacking in productiveness, but at Lipa and at Manila three-year trees are showing quite a third of a pound per tree.

It is believed that gradually the coffee industry, all but lost, may be restored, at least up to the point of wiping out the imports of $114,578 worth per annum. Java once lost an immense coffee industry from the same causes, and many years ago began building it up again by planting robust kinds of trees. That country has replaced one-third of her former great production.

[From Report of the Philippine Commission, 1904, vol. 2, p. 68.]

COFFEE PLANTATION AT LIPA, BATANGAS.

The manager of the Batangas station is also superintendent of the coffee plantation at Lipa, where 10 acres of young trees are thus far free from any sign of disease. The fact that the coffee plantations of Batangas Province, formerly a source of great wealth to the inhabitants, were annihilated in the years 1888 to 1890 has been mentioned in previous reports. The coffee growers were so discouraged that they have never made any effort to rehabilitate the industry. The present experiment is being conducted at government expense, with a view to demonstrating whether the reestablishment of the once important coffee-growing industry in the lowlands of the Philippines is possible. It may incidentally be mentioned that coffee of excellent quality is produced in Benguet, Lepanto, and Bontoc and that these mountain plantations, although badly cared for or utterly neglected, seem never to have suffered seriously from disease.

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[From Census of the Philippine Islands, 1905, vol. 4, p. 76.]

COFFEE.

Prior to 1891 coffee was an important and remunerative product of certain provinces, and constituted a source of considerable wealth in the sections in which it was cultivated. In 1890 and for several preceding years the values of exports of coffee ranked fourth in order of importance and did not fall far below those of tobacco, having been 7.4 per cent in 1890, 7.1 per cent in 1899, 7.7 per cent in 1888, 8.3 per cent in 1887, and 5.3 per cent in 1886, of the entire value of exports.

Subsequent to 1890, due to the devastation of coffee plantations by insects and disease, the production of the berry rapidly diminished and finally almost ceased. Thus the value of its exports dropped to one-half of 1 per cent of all exports in 1893, and to 1.1 per cent in 1894, since when its production and exportation have been merely nominal.

The coffee of the Philippines has a fine aroma and excellent flavor, and will compare favorably with either Java or Mocha coffee. It is said to have been brought to the islands by Spanish missionaries during the latter part of the eighteenth century and its systematic cultivation to have commenced early in the nineteenth century. It was first cultivated in the province of La Laguna; subsequently in other provinces, notably Batangas and Cavite, coffee growing became an extensive industry. Most of the coffee was produced in the provinces named and in Tayabas, on Luzon Island, and in Misamis and the district of Cottabato, on Mindanao, though appreciable quantities were grown in other provinces. The highest grades of the berry were grown in Batangas Province and the most inferior on Mindanao Island.

Cultivation of Coffee in the Municipality of Lipa, Province of Batangas.

[By Hon. Simeon Luz, Governor of Batangas.]

Nothing appears of record in the official archives of the province of Batangas nor on the parochial books of the municipality of Lipa regarding the history of the introduction of the first coffee plants in this section; popular versions speak of its propagation by means of spontaneous growth.

It is also said that about 1808 there were only a few specimens of this plant in the orchards and gardens of some of the houses of the residents, which served as ornaments on account of their beauty while in blossom, and that the foxes would enter these gardens on their nocturnal expeditions to feed on the ripe berries of this little tree, and leaving their excrements with the grains in the mountains and woods which were their haunts, the berries would there germinate and sprout. These served later as seed beds or nurseries for subsequent plantings made by the residents, when the local authorities obliged each resident to plant a certain number of square feet of his land with coffee.

Don Galleo Reyes, a prominent native and resident of Lipa, coming, as he did, in frequent touch with the Spanish authorities and many foreigners who would stay at his house when visiting the celebrated Taal volcano, received information from them regarding the importance of this product in the commerce of the world. He took steps to encourage the propagation of this valuable plant among the natives, availing himself of his authority as petty governor. He continued the work of propagation during the years of 1812, 1822, and 1825, when he was elected petty governor of the town. His son, Don Santiago de los Reyes, elected petty governor in 1832, continued the work of his father and extended the area of coffee planting more and more, the residents securing seed with more facility as the plantations increased.

But the cultivation of coffee on a large scale did not begin in Lipa and in the adjoining municipalities (where many residents of Lipa own property)

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until the year 1859, increasing gradually until 1889, when the disease occurred which completely destroyed the coffee plantations. The importance of this product was appreciated a few years before 1889, when the price on the market of Manila reached 20 pesos to 25 pesos per picul, having brought during previous years not more than 3 pesos, 5 pesos, 8 pesos, or 10 pesos per picul.[a] The most active and enthusiastic planter on a large scale, who by his example gave a great impetus to the growing of the berry, was Don José Luz (my father), who at various expositions and fairs in this province during the years from 1867 to 1880, received the highest premium in this branch of agriculture.

While no method was observed in the beginning in the planting of coffee, in time the planters learned the good results to be obtained from planting the madre de cacao or anii in rows as a protection to the coffee tree.

The seed of the madre de cacao or anii is sown in rows at intervals of one step and a distance of 1 braza between the rows. The best season of the year for the planting thereof is during the months of May and June. About a year after the madre de cacao has been planted it has developed sufficiently to shade the spaces between the rows. Then the coffee plant is set out between the rows in parallel lines, leaving a distance of 1 braza between the plants. The shoots are obtained from the natural seed bed, as has been stated above. The madre de cacao is planted in this close manner so that, covering the earth almost completely with its shade, it will prevent the spontaneous growth of weeds, etc., which would interfere with the development of the coffee plant and the removal of which would be very expensive to the planter. Every year, between March and August, a clearing up takes place. The first year the lower branches of the protecting trees are removed, the second year some trunks, and the third year entire rows of the protecting trees, according to the development of the coffee plant.

Opinions of planters do not agree as to the time intervening between the planting of the protecting tree until the coffee plant begins to bear. The opinions vary between four, five, six, and seven years after the planting of the coffee plant. It is my belief that this varied experience of planters depends on many causes which have contributed to the more or less rapid development of the plant. There is no doubt that soil conditions, care in the reduction of the shade, and in the removal of weeds and undergrowth which choke the coffee plant contribute to its rapid development. But it may be asserted that six years must elapse before the profit from 1 hectare of planting would offset the cost of cleaning and caring for one year, although I believe that by adopting modern methods the time of fruition may be advanced one or two years. Many skilled planters agree that the average time required for the development of coffee is twelve years. A plantation of average fertility will yield from 12 to 20 piculs per hectare, provided it is given the greatest possible care and attention according to the methods observed by the natives in the cultivation and preservation of this plant.

The cost of planting the madre de cacao and coffee in 1 hectare of land represents an average of $30, more or less, distributed as follows:

To plowing the land 3 times by 1 laborer in nine days	$8.46
Planting of madre de cacao, 2 men, two days	1.25
Cost of 7 gantas of madre de cacao seed, at 25 cents	1.75
Cost of coffee plants, 3,333 plants, at 50 cents per 100	16.67
Wages of 5 laborers for the planting of coffee in two days, at 30 cents per day	3.00
Total	31.13

The blossoming of the plant depends on the last rains of the preceding year or the first rains of the following year. It is also governed by the condition in which the plant was left after the last crop with regard to the bruising and injuries to the axils.

Coffee blossoms three times—first in January or February, second in March or April, third in May or June. Hence there are three crops—between August and September, in October, and in November—the maturity of the berry lasting seven months.

[a] The equivalents of the weights and measures here used are as follows:
1 picul=63.262 kilograms=139.467 pounds avoirdupois.
1 braza=1.671812 meters=5.49 feet.
1 hectare=2.471 acres.
1 ganta=3 liters=6.34 pints.
1 cavan=75 liters=19.81 gallons.

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If the rains are heavy in November or December, the coffee will begin to blossom in January or February. If there be no rain in the first-named months, nor in January or February, neither the first nor the second crop will mature, as the night dews are not sufficient for the purpose. Many planters are of the opinion that the abundance of the annual crop would be greatly improved by irrigation.

The method observed in harvesting the crop is very primitive. It consists in picking the berries with the hands and placing them in a basket hanging from the waist. As it is not possible in a majority of cases to reach the upper branches, each picker provides himself with a hook, made of a branch of the madre de cacao, with which he draws down the branch, holding the latter down with his feet, and thus leaving both hands free for picking the ripe berries. The coffee picker receives no wages for his work, but retains one-fifth of the coffee picked during the day. Hence, being anxious to pick as much as possible, he does not care what damage he does to the plant, usually breaking and destroying the most vigorous branches of the bush. One of the hardest tasks of the planter is to watch out for this during the time of the harvest, as reduced crops are sometimes due to the damage done to the plants.

The process of drying consists in leaving the grains in small piles to ferment for twenty-four hours and then spreading them out in an inclosure specially constructed for the purpose, called a "bilaran," made of clay and cement well leveled and polished, until the grains have acquired a hardness sufficient to resist the action of the cleaning instruments, which consist in the primitive mortar and pestle usually used for the cleaning of rice.

This method of drying takes much time and work. If it be done during the rainy season, in most cases the grain does not acquire sufficient hardness, nor does the outside covering become sufficiently brittle until thirty and sometimes fifty days have elapsed after they have been spread out in the bilaran for drying. This causes not a small loss to the planter, as many of the berries rot.

The cost of cleaning, airing, sifting, and sorting 1 picul of coffee is about $1 Mexican.

There is another method for drying coffee, which is used by planters on a small scale. This method consists in removing the outside pulpy rind of the grains, which, after being carefully washed, are placed in the sun to dry. After four or five days they have become sufficiently hard for the operation of cleaning. A machine moved by a hand winch is used for removing the outside hull. This triturates the first rind without doing injury to the second. The machine is made of wood and is called "pipisan." This method saves much time, but the washing operation is very laborious, and in places at a distance from springs and rivers it is practically impossible to do the washing on a large scale. The coffee with the inside skin or rind prepared according to the last-named method is called "butil," while that prepared according to the first-named method is called "bayate."

The cost of weeding and caring for a hectare of a coffee plantation varies according to the method adopted by the planter. Many who consider only the preservation of a clear soil leave the protecting trees with all their branches which cover the ground completely with shade and do not permit weeds to grow. This method is very cheap. On the contrary, a planter who understands that too much shade, while it favors the preservation of a clear soil, injures the florescence and maturing of the plant, takes special care to remove part of the branches of the protecting tree and spends much more in the care of his plantation.

The average cost of caring for 1 hectare of a coffee plantation may be estimated at $10 Mexican per annum.

As I have stated above, the average crop from 1 hectare of a coffee plantation, carefully attended to and without sparing expense for weeding and thinning out of the branches of the protecting tree, is from 12 to 20 piculs, but most plantations have yielded only an average of from 6 to 10 piculs per hectare on account of various causes which have affected the crop. One of the principal causes is the failure to reduce the shade in order to save expense in weeding the soil. Coffee requires shade, but not too much. It requires breathing space. It needs the sun, without receiving its direct rays. Hence, the branches of the protecting tree should be thinned out and cut down for 3 yards above the highest branch of the coffee, in order to permit the humid air to have free access to the plant.

The duration of the bearing life of the coffee plant is unknown, although some old inhabitants of the locality relate that among the plantations destroyed

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in 1889 there were some which had been in existence for more than fifty years, and which still bore when in a dying state.

The highest prices which this article brought in the Manila market in 1899 were 25, 30, and 35 pesos per picul.

The total crop of the territory comprised in the municipality of Lipa in 1887, 1888, and 1889 reached approximately 60,000, 80,000, and 100,000 piculs, respectively, according to reasonable estimates made by the principal merchants and planters of this town.

The lands most suitable for the growing of coffee, in the opinion of the most skilled planters in Lipa, are high and inclined lands which do not retain the water, although it is believed that nine-tenths of the territory of Lipa is excellent for coffee.

Two kinds of worms caused the total destruction of the coffee plantations of Lipa and of the other townships of the province—the "hunus" and the "bagumbung." The hunus attacks the main trunk and the roots of the tree and the bagumbung the branches. These two worms are almost identical in form, although very different in the residiuum they leave and in the method of destruction. They have been made the subject of study by a Spanish expert, Mr. Domingo Sanchez, civil engineer, sent by the former Spanish Government to investigate this evil. He published a pamphlet, giving the result of his studies, which was printed at the expense of the Spanish Government and which contained a description of the life and development of these insects. This pamphlet should be on file in the archives of the present government. These worms were known to all the planters from the time of the introduction of coffee into the province, and every year they did some damage to the plantations. This damage was so small, however, that no one bothered about seeking a remedy for an evil which he did not believe could cause a complete destruction of all coffee plantations. But in 1889, to the great surprise and fear of all, it was observed that all the plantations of the province were attacked. That year saw the total loss of the crop and the death of almost all the coffee plants throughout the territory which Lipa comprises.

From the trunks which remained new healthy branches grew, and two years later, as if by enchantment, the hunus and the bagumbung disappeared; but another more terrible and persistent enemy appeared (as up to the present time no other disease is known) in the form of yellowish-red spots which appear on the leaves after the blossoming period and at the beginning of fructification.

In the months of May and June, if the rains are plentiful, the coffee plant presents a luxurious aspect, which at first sight pleases the planter, reminding him, as it does, of the times when no disease was known to affect the plant. But with the increase of the rains the spots begin to appear, which increase in size until they attain the dimensions of a Philippine peseta, and have a dust which bears a resemblance to the description of the French mildew, recognized as a true microscopic vegetable fungus. As the spots increase the leaves become yellow, dry up, and finally drop off, leaving the branches in December or January entirely bare until the months of March and April, when the plant blossoms. No one has as yet made a study of the last-named disease nor sought a suitable remedy to combat it.[a]

The planters of Lipa and other municipalities of the province lost all hope of reviving coffee in that locality, and cleared their lands of this plant in order to grow sugar cane, rice, and corn. I believe that hardly one one-thousandth part of the former coffee plantations are now in existence.

Before 1889 about two-thirds of the territory comprising the district of Lipa was planted in coffee, and only one-half of the plantations were bearing, the remainder of the plantations having a life of from one to six years.

The madre de cacao and the anil are two trees known as coffee protectors. These trees are excellent as protectors for the coffee plant because they develop so rapidly. The madre de cacao, furthermore, is one of the best classes of building woods, the only defect being that it does not attain the size of the "molave" and "banaba." It has the hardiness and resistance to weather which the molave has. The supports of 90 per cent of the houses of the barrios and of the towns are made of this valuable wood, and it is believed that it will last from twenty to forty years under the ground. The anil is a tree with a thick trunk, but of no use for building purposes, as its wood is soft and porous.

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[a] The disease referred to is the "leaf blight," caused by *Hemileia vastatrix*, a microscopic fungus parasite.

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The insular bureau of agriculture is conducting experiments with a special class of coffee in Lipa, and many of the residents are anxiously awaiting the results, because everyone is convinced that coffee is the only product that can save the critical situation of the residents of this municipality, which was formerly so wealthy.

All the municipalities adjoining Lipa have had coffee plantations, although not on so large a scale, and I am of the opinion that most of the municipalities of the province possess large areas of land suitable for the growing of coffee.

A rich resident of Manila owns, in the municipality of San José, a plantation of Liberia coffee of considerable extent, and with proper care it would yield large crops. I do not know the extent of the crops during the past few years, but persons skilled in the matter state that it does not produce as much as the primitive coffee.

Coffee Culture in the Province of Benguet.

[By Hon. W. F. PACK, Governor of Benguet.]

The Benguet coffee, or as good as the Benguet coffee, is advertised for sale by the merchants of the Philippines and in Spain, but there is little even raised, let alone put on the markets of the world.

It is indeed a rare coffee for both flavor and cleanliness. There is no blight that has ever attacked the coffee plant of Benguet. The altitude, temperature, and humidity of the air all combine to make this province peculiarly adapted to the successful growth of coffee; still, in 1901 there were only 697 cavans raised in the province and last year, 1902, but 852. New coffee plantations are being planted and in a few years the real Benguet coffee will be on the market.

Coffee was first introduced into this province by the Spaniards in 1875, by the military governor, Manuel Scheidnegal y Sera, who planted in the vicinity of Galiano, forming a government garden for the experiment. But while the plants thrived therein, he did not achieve the success anticipated, owing to the low altitude and heavy rains, which affected the flavor of the coffee planted, that situation being more favorable for a Rio than for the Java of Arabia, with which this progressive governor was experimenting. However, the plants grew luxuriantly, and in 1877 his successor, Governor Enrique Oraa y Bravo, transplanted to the plateaus at an altitude of from 4,000 to 5,000 feet, and distributed seeds among the people of the barrios of the province.

The native Igorots neither favored nor opposed at this time the introduction of this product; but in 1881, the plants having come to the bearing stage, Governor Villena endeavored to force the cultivation and enlargement of coffee plantations by ordering all natives of the province to plant, grow, and work coffee. This created an opposition that in Daklan extended so far that the Igorots there, acting under the advice of their old men, attempted to destroy the plantation by pulling out young plants; but to pull up the young coffee plant and throw it on the ground does not necessarily kill it, and the coffee resprouted. After this the natives went so far as to pour boiling water on the plants to kill them, and did succeed in Daklan in killing out the coffee culture.

In Kabayan the natives were under the domination of a young Igorot chief named Camising. This young chieftain had secured his influence and power over his followers not merely through his wealth, which consisted of herds of cattle and horses and large rice sementeras, but also because of his exceptional valor in personally defending his people against the attacks of busoles, or head-hunters, of the North. He bears to this day the scars of many hard-fought battles. This young chief, after many visits to the capital and much study and observation of the new product that was being forced upon his people, became thoroughly satisfied that it would be very valuable to them; he therefore took upon himself the duty of introducing the coffee into Kabayan.

Under his leadership it was planted, cultivated, and grown, and no opposition to its culture was permitted for an instant. In four years they began gathering crops. Camising took charge of the sale of their crops, and discovered that the coffee was constantly increasing year by year in value per cavan. He himself went to the coast to learn its worth—a long trip in those days for a mountain Igorot. They gradually enlarged their coffee fields, and last year five-eighths of the coffee of the province was grown in Kabayan.

Meantime the Igorots of Daklan, who had destroyed their first plant, discovered that their neighbors in Kabayan were exceedingly prosperous, that they had much money, and that, comparatively speaking, gave but little labor

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for the money they received. So, though at a late date, they endeavored to retrieve their error, and have planted large fields, and will, undoubtedly, in the course of a few years, successfully rival Kabayan in the amount of coffee produced.

The coffee raised in the highlands of Benguet has been bought in by the Tabacalera Company year after year, and the entire crop shipped to Spain, and there disposed of at fabulous prices. None of it went on the market in Manila. But little has ever been used in Manila, and that little only by the friends of residents of Benguet or officials of the Tabacalera Company, by favor. It is the aim of the present government to foster this enterprise by every means within its power among the natives of the province; nor do I doubt that in the future the white man with his inherited enterprise will enter this territory for which nature has done so much, and make it the coffee producing province of the archipelago.

A coffee plant six years old should produce 3 pounds of coffee a year of a most desirable flavor, and there is little danger of the destruction of the crop by blight. The demand for this coffee will always be greater than the possible supply. The only obstacle in the way of making coffee cultivation a most profitable industry is the difficulty of obtaining suitable labor. The question of labor will depend entirely upon the individual. The cost of labor for hacienda or ranch purposes will average from 5 to 10 cents gold a day, depending upon the kind of labor required and the age or sex of the laborer.

As these coffee plantations now in the province have been planted and cared for mostly by the women, and at odd moments when they were not otherwise occupied, it is impossible to estimate the cost of making or caring for a coffee plantation, but it is usually estimated by growers who are so far civilized as to figure on profit and loss, that the coffee trees, after an average age of five years, should net the owner 25 cents gold each year. These trees may be planted 6 feet apart. This coffee sells in the market in Benguet to-day at from $6 to $7.50 gold a cavan, which should weigh about 67 pounds.

[From Census of the Philippine Islands, vol. 4, 1903, p. 207.]

CULTIVATION AND PRODUCTION OF COFFEE IN THE PHILIPPINES.

Coffee culture was a fairly important agricultural industry in the Philippines prior to 1898, but the ravages of insect pests reduced it to small proportions, and in 1902 only 999 hectares were reported as devoted to its production, the total quantity produced amounting to only 181,091 liters. About a third of the insular coffee area was in the province of Cavite, in which 330 hectares were reported; Batangas ranked second in area, with 145 hectares, and Lepanto-Bontoc third, with 125 hectares. In the other provinces and comandancias producing coffee the areas ranged from 1 to 86 hectares, except in a few in which there was no production or such small yields that the areas were not reported.

The apparently wide divergencies in yield per hectare in the different provinces and islands are very remarkable, as shown in the two following statements, which indicate the portions of the archipelago in which the culture has attained the greatest success. This seeming difference in productiveness is largely accounted for by the fact that in several provinces coffee trees had been planted, but had not come into bearing at the date of the census; the areas of land upon which they were planted were reported by the enumerators; there is, therefore, no real relation between the figures of area and of production of this crop. In the two statements the provinces and islands are arranged in accordance with their importance as producers of coffee, those producing the largest quantities being placed first; the ones producing less than 5,000 liters are grouped together, their separate production being too small to be of significance.

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[From El Cafetal, New York, August, 1903.]

ECONOMIC IMPORTANCE OF THE COFFEE INDUSTRY.

The cultivation of coffee is a branch of tropical agriculture of greater importance and extent than the general public and the planters themselves can imagine. From the results of a careful compilation of statistics recently collated and published from various governmental and private sources for the period from 1900 to 1902 the following data are calculated:

The total number of coffee plantations in the world, large and small, but which can properly be classified as such in the full meaning of the word, reaches 49,000, distributed among the three coffee-producing continents—America, Asia, and Africa.

Their total annual production of coffee amounts to more than 21,500,000 bags, of an average weight of 134 pounds each, or 2,881,000,000 pounds.

This production represents a total value of more than $255,000,000 annually contributed by the coffee industry to the world's trade and commerce. Such a grand total is realized by the annual net product of more than 1,800,000,000 coffee trees in full bearing.

The land used for coffee growing, exclusive of the area used for the production of other fruit in connection with coffee, exceeds 3,600,000 acres. The value of the property, including buildings, machinery, and other utensils is more than $1,350,000,000, based on the low values that have prevailed from 1900 to 1902.

The average total number of persons engaged during the year in planting, tending, harvesting, curing, and handling the crop, including office force, reaches 2,220,000 men, women, and children.

The total amount paid annually in wages and salaries to laborers and the office force, exclusive of interest on capital, taxes, etc, exceeds $135,000,000.

Upon these data the following interesting average calculations are based:

The average area of each plantation exclusively devoted to cultivation of coffee is 73½ acres.

The number of coffee trees in full bearing is 36,735 for each plantation.

The average yield of raw coffee (en oro) is 1⅝ pounds per tree.

The average number of trees planted per acre is 500.

The average production of each plantation is 58,796 pounds of coffee.

The production per acre is 800¼ pounds.

The average number per year of laborers and other persons employed on each plantation is 45, or one for every 1⅝ acres under cultivation, or one person for 818 coffee trees, equivalent to one person for each 1,309½ pounds of coffee produced and prepared.

The average annual salary paid to each employee is $61.36.

The average cost of labor in the cultivation, production, and preparation of coffee is 4.7 cents per pound.

The average value of each coffee plantation, including the value of buildings, machinery, and other utensils, is $27,551, or $375 per acre.

The average return for each plantation through the sale of its entire product of coffee is $5,204, or at the rate of 8$\frac{57}{62}$ cents per pound of coffee.

[The following is from the Monthly Summary, Treasury Department, June, 1902, p. 1246.]

Coffee.—Despite the ravages occasioned by worms a few years since, which so discouraged coffee planters, the growing of coffee, which, in the past, frequently stood third in importance as one of the principal articles of export, may again become one of the most profitable industries of the Philippines. That it may be highly remunerative has been fully demonstrated in the vicinity of Lipa, in Batangas Province.

[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 629.]

INTEREST IN COFFEE EXPORTS CHIEFLY HISTORICAL.

The coffee exports of the Philippines have long since ceased to be of any importance, and a review of the industry has an interest chiefly historical. From this point of view, however, these exports assume considerable importance, and in the banner years of production, 1883 and 1884, with export quantities exceeding 16,000,000 pounds and values exceeding $1,000,000, they represent an industry of no little significance in the agricultural assets of the islands.

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DEVELOPMENT AND DISAPPEARANCE OF EXPORT TRADE EMBRACED WITHIN HALF CENTURY.

Within the half century of figures under survey is practically embraced the complete history of the industry, the record of its development, maturity, and destruction—1,246,479 pounds are given as the coffee exports of 1855, and with steady increases thereafter the industry seems to have reached its maximum period of productiveness during the eighties. It is stated that coffee production in the islands received a serious setback in 1889, due to ravages of an insect pest in the plantations, which was succeeded by a leaf blight that completed the unfinished work of the earlier calamity. The figures show that with exports amounting to 13,709,647 pounds in 1889, they had precipitately declined to 642,595 pounds four years later; while in the American period, with maximum exports of 68,228 pounds in 1901, and but 22,492 pounds in the present year, further emphasis is given to the extent of the adverse conditions that affected production in the early nineties, and the Philippine coffee industry is stamped as a thing of the past.

PRICES.

Philippine coffee, though stated by some to rival in quality that of Java, does not seem to have received such recognition in the markets of the world. Prices during the years of the highest production were only about 7 cents a pound, but in the diminishing production of the latter eighties and 1890 they had a great increase, and export values in spite of reduced quantities exceed $1,500,000, and represent an importance and degree of prosperity for the industry much in contrast with the $3,153 worth of coffee exported in the present year.

COUNTRIES SHARING IN THE EXPORT TRADE.

The chief consumers of Philippine coffee have been Spain, the United Kingdom, and the United States, together with a confused but important China-Hongkong trade. Spain has figured throughout, but most conspicuously in the period of greatest and declining production, when her share of the total exports ranges from one-third to two-thirds. The China-Hongkong trade has been of about equal importance to that of Spain, though in the reduced figures of the early nineties it amounts to but about half the Spanish. The United Kingdom was the most conspicuous taker of these exports during the greater part of the seventies, but in the increased quantities of the eighties played a minor part. The United States purchases of Philippine coffee were heaviest in earlier times, reaching 1,359,707 pounds in 1866. After 1880 in but the single year 1883 do they amount to as much as 100,000 pounds, and are of little relative importance. In the insignificant coffee exports of the American period, the United States takes about a third in the present year, but China has been the largest constant purchaser of the quinquennial period.

LARGE IMPORTS IN 1904 VERSUS NOMINAL EXPORTS.

The figures under review indicate the prosperous past of the Philippine coffee industry and show its virtual disappearance as an export factor. To what extent it still contributes to the domestic market there is no means of knowing, and it may only be inferred from the fact that contemporary with the nominal exports of recent years there have been imports for domestic consumption of relatively large quantities, amounting to 998,198 pounds in 1902 and 396,857 pounds in the present year. This point, however, is aside from the purpose of the present review, except in as far as it indicates the existing basis for the restoration of the industry to future export importance; and in view of the figures given, combined with facts bearing upon them, it would appear that the outlook for such a restoration is not promising.

OUTLOOK FOR THE REVIVAL OF THE INDUSTRY.

Much has been recently said of the revival of the industry and the aid of an American import duty on coffee in connection with free trade for the Philippine product as a means to this end. The disposition in certain circles is to treat this once profitable industry as an asset in the plans under consideration for

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bringing prosperity to the islands. It may be so regarded in a way, for the rich returns of the coffee plantations and the suitability of soil and climate to production are matters of record; but it is to be borne in mind that coffee plantations with their rich returns are of slow growth, requiring outlays of capital and from six to twelve years of patient attention and waiting for the first realization of these returns. Extensive investments of this character do not seem probable with the memory of the calamity of fifteen years ago still fresh, and especially in view of the fact that scientific research seems to have failed thus far to find a means of successfully combating the scourges that have destroyed the industry. Not until such a means is found to prevent the repetition of that disaster, and even then not for some years does it seem probable that there will be any large return of confidence and capital to the planting of coffee on such a scale as to make it again an important factor in the agricultural wealth of the islands. The future of the Philippine coffee industry seems for the present to be in the hands of the scientist and agricultural expert.

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[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 785.]

Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1855–1884.

Year.		United States.	United Kingdom.	Spain.	China.	British East Indies.	French East Indies.	Other countries.	Total.
1855 [a]									
1856	Pounds	428,318	210,573	19,858	70,053			1,912,535	2,641,337
	Dollars	29,344	14,799	2,614	6,041			163,386	216,184
1857	Pounds	398,669	109,493	111,009	331,512			1,750,640	2,701,323
	Dollars	38,948	10,920	13,501	37,815			103,852	205,036
1858	Pounds	295,106	126,179	435,902	228,087	7,584	73,501	2,074,981	3,241,340
	Dollars	27,764	10,811	41,094	22,132	634	7,050	200,689	310,174
1859 [a]									
1860	Pounds	349,576	249,185	53,919	615,310	965	276	724,251	1,993,482
	Dollars	40,035	21,364	5,443	56,588	98	21	69,147	192,696
1861	Pounds	687,293	244,221	790,581	533,121	12,411	552	2,332,027	4,600,206
	Dollars	73,250	13,428	39,685	56,189	754	60	248,023	431,389
1862	Pounds	940,755	625,276	232,196	425,541	21,505	27,896	322,376	2,595,545
	Dollars	103,008	51,536	25,603	48,934	2,608	3,126	31,786	266,601
1863	Pounds	647,694	305,842	1,724	774,901		1,623	843,169	2,574,953
	Dollars	96,884	25,351	244	109,341		222	94,984	327,026
1864	Pounds	1,156,923	394,399	300,161	1,287,578			837,894	3,976,955
	Dollars	151,850	66,770	34,746	157,213			118,032	528,611
1865	Pounds	594,594	1,208,614	599,905	234,287	86,621		1,388,506	4,112,527
	Dollars	59,371	118,259	65,988	25,736	9,545		154,219	438,118
1866	Pounds	1,359,709	733,761	209,913	221,668	258,803		965,172	3,749,026
	Dollars	164,887	74,111	26,296	[b] 23,652	35,358		115,521	439,825
1867	Pounds	1,350,441	1,031,178	738,285	198,899	179,205		1,434,851	4,932,859
	Dollars	139,908	150,837	83,949	[b] 25,420	10,670		149,208	559,992
1868 [a]									
1869 [a]									
1870 [a]									
1871 [a]									
1872 [a]									
1873	Pounds	493,515	3,956,366	484,834	53,854	633,282	1,009,184	1,299,722	7,930,757
	Dollars	68,491	549,146	67,295	[b] 7,475	87,900	140,075	180,403	1,100,785
1874	Pounds	254,687	2,804,838	428,856	11	2,803,292		840	6,292,524
	Dollars	38,283	442,694	72,493	2	437,179		120	990,771
1875	Pounds	1,100,054	5,934,644	421,277		1,788,045		348	9,244,368
	Dollars	171,848	757,537	56,535		208,043		52	1,194,015
1876	Pounds	295,738	2,985,278	1,090,616	646	3,984,076	551	2,231	8,359,136
	Dollars	36,403	361,304	162,054	92	458,442	73	273	1,018,641
1877	Pounds	1,188	5,303,917	2,063,122		2,553,474	348	119	9,942,168
	Dollars	159	722,182	283,967		342,143	49	104	1,348,604
1878	Pounds	34,363	84,008	2,447,549	697	2,124,617	669,456	555	5,361,245
	Dollars	4,403	11,031	325,939	93	274,419	95,693	75	711,653

[a] Figures not available.

[b] Includes Cochin China and Japan, not separately reported.

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Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1855–1884—Continued.

Year.		United States.	United Kingdom.	Spain.	China.	British East Indies.	French East Indies.	Other countries.	Total.
1879	Pounds	14,076	1,222,815	3,825,585	3,964	2,545,575	141	940,039	8,552,195
	Dollars	1,611	137,859	439,351	486	283,603	18	123,640	986,568
1880	Pounds	24,965	686,409	3,836,008	3,205	3,905,976	2,852,404	139	11,309,106
	Dollars	2,934	146,363	441,005	364	718,682	368,208	14	1,677,570
1881	Pounds	348	2,498,650	5,204,679	2,074	4,564,510	----------	----------	12,270,261
	Dollars	29	210,114	437,667	174	383,834	----------	----------	1,031,818
1882	Pounds	3,474	4,350,216	2,545,394	3,276	4,185,852	1,264,082	----------	12,352,244
	Dollars	292	552,440	28,722	276	351,556	107,760	----------	1,041,046
1883	Pounds	137,333	5,588,743	3,833,817	4,184	7,239,995	278	851	16,805,201
	Dollars	11,039	400,059	272,633	309	434,680	24	42	1,118,786
1884	Pounds	7,732	171,412	8,139,762	2,515	8,277,255	139	862	16,599,677
	Dollars	568	12,314	659,020	215	611,996	10	72	1,284,195

NOTE.—Hongkong included under China from 1856–1867, and from 1873–1884 under British East Indies.

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[From Monthly Summary of Commerce of the Philippine Islands, December, 1904, p. 629.]

Quantity and value of coffee exported from the Philippine Islands, by countries, calendar years 1885–1894—1900–1904.

Year.		United States.	United Kingdom.	Spain.	China.	Hongkong.[a]	British East Indies.	French East Indies.	Other countries.	Total.
1885	Pounds	71,550	296,053	5,487,670	1,396		5,239,999	838	956,286	12,053,792
	Dollars	5,158	19,269	392,263	96		342,480	50	61,294	820,610
1886	Pounds	94,564	301,473	6,571,996			6,909,415	1,897,574	1,951	15,776,973
	Dollars	5,868	22,382	465,328			455,337	109,984	122	1,059,021
1887	Pounds	93,843	1,375,254	6,109,500	463		3,218,841	31,978	78,365	10,908,244
	Dollars	5,739	227,138	920,478	80		443,059	4,889	10,626	1,612,009
1888	Pounds	115	2,726,025	4,943,822	4,673,068		1,734,963	7,626		14,085,619
	Dollars	12	254,708	563,685	434,265		246,923	825		1,500,418
1889	Pounds		2,254,245	5,249,644	5,207,569		853,783	143,987	419	13,709,647
	Dollars		311,939	716,253	668,952		102,923	18,404	73	1,818,544
Average annual	Pounds	52,014	1,390,610	5,672,527	1,976,499		3,591,400	416,401	207,404	13,306,855
	Dollars	3,355	167,087	611,601	220,679		318,144	26,831	14,423	1,362,120
1890	Pounds		355,088	4,398,649	4,678,135		333,987	110,508		9,876,317
	Dollars		52,647	744,720	741,967		38,766	10,316		1,588,416
1891	Pounds		174,677	4,990,534	870,962		207,947	16,254	4,068	6,264,437
	Dollars		23,100	801,631	114,973		12,795	2,671	879	956,049
1892	Pounds		198,105	2,175,828	556,048		46,105	18,393	5,192	2,994,671
	Dollars		24,531	322,211	82,187		2,208	2,600	813	434,550
1893	Pounds		12,264	564,545	48,550		3,073	141	14,022	642,595
	Dollars		1,248	90,636	8,411		531	25	2,593	103,439
1894	Pounds			1,012,595	189,613		116,915		10,595	1,329,718
	Dollars			143,666	28,336		4,384		1,208	177,589
Average annual	Pounds		147,027	2,628,430	1,268,662		141,595	29,059	6,774	4,221,547
	Dollars		20,304	420,573	195,175		11,737	3,122	1,098	652,009
1900	Pounds	146	2,171	3,523	1,430	20,817	1,100		638	29,825
	Dollars	25	377	487	225	1,777	148		103	3,142
1901	Pounds	1,832	927	3,094	10,920	24,003	24,991		2,461	68,228
	Dollars	225	160	236	902	1,832	1,820		262	5,437
1902	Pounds				6,190	7,686	2,295		288	16,459
	Dollars				1,009	1,272	105		46	2,432
1903	Pounds			1,278	4,301	1,485	42		1,231	8,337
	Dollars			170	566	180	8		171	1,095
1904	Pounds	6,648	198	1,342	9,614		68		4,622	22,492
	Dollars	707	30	155	1,555		12		694	3,153
Average annual	Pounds	1,725	659	1,848	6,491	10,798	5,699		1,848	29,068
	Dollars	191	113	209	851	1,012	419		257	3,052

[a] Hongkong included under British East Indies from 1885–1887, and from 1888–1894 under China.

NOTE.—Figures prior to 1900 are taken from "Estadistica general del comercio exterior de las Islas Filipinas," issued by the Spanish Government, and all quantity reductions necessary in preparing the different tables herewith have been on the basis of kilogram=2.2046 pounds, picul=137.9 pounds, quintal=101.44 pounds.

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[From Monthly Summary of Commerce and Finance of the United States, July, 1905.]

THE COFFEE TRADE IN 1905.

The coffee situation in the United States; recent interest in the industry.

The commercial conditions of the coffee industry have attracted the attention of the American business world to an increased degree since 1898, when Porto Rico, Hawaii, and the Philippines came into our possession. Previous to that date our interest in the coffee trade lay solely in the fact that we were the largest consumers of coffee. We still hold this position, as may be seen from the following summary:

Consumption of coffee in certain leading countries in 1904.

Countries.	Pounds.	Countries.	Pounds.
United States	960,879,000	Austria-Hungary	108,687,000
Germany	396,205,000	Holland	28,930,000
France	167,552,000	United Kingdom	28,783,000
Belgium	125,411,000	Canada	6,189,000

In other words, we consumed nearly two-fifths of the world's production of 2,299,270,000 pounds in 1904, the term production being understood to mean the quantities exported and imported, for the home consumption of the producing countries can not be ascertained. The consumption of Germany, the next largest, is but little more than two-fifths of ours.

The events of 1898 gave a new aspect to the situation. From having been mere consumers, we suddenly became also producers, each of the three groups of tropical islands that fell into our possession having a well-established coffee industry. What this may mean for us may be illustrated by the experience of England and Holland. No sooner had the tea industry in British India and Ceylon been placed on a modern basis than the British public, unconsciously, it would seem, began to train their taste to relish Indian rather than Chinese tea, with the result that Great Britain at this day obtains most of her tea from her East Indian possessions. Practically all the coffee consumed in Holland comes from the Dutch East Indies. It is not unlikely, therefore, that of the $70,000,000 or thereabouts which we annually send abroad to pay for our coffee an increasing amount will find its way into our insular possessions. Provided that coffee prices are profitable, there is good reason to believe that with a practically limitless market the conditions of coffee culture will soon improve in our insular possessions, resulting in increased prosperity and greater purchasing power of the inhabitants.

In recent years we have been drawing most of our coffee supplies from Brazil (in 1904, 741,759,000 out of the total of 960,879,000 pounds imported). Brazilian coffees are classed as "strong," as distinguished from the "mild" coffees of other regions, including our own insular possessions. In addition to this, they are much cheaper. If, therefore, the United States is to shift its patronage in the matter of coffee in part from the foreign to the home market, it will mean two things: (1) That the taste of the public is to be weaned from strong to mild coffee; (2) that either the mild coffees must become cheaper or the American consumer must spend more. That the public taste can be transformed in the manner suggested has just been illustrated by the conversion of Britain from Chinese to Indian tea. It is further illustrated by the fact that

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in some parts of Europe chicory, which at first was added to coffee as an adulterant, is now regarded as an indispensable addition, being even sold separately for that purpose. As regards the price, it is difficult, of course, to make predictions. It is to be noted, however, that the United States has hitherto been regarded as the dumping ground for coffee that could not be sold elsewhere and that this is a condition which the American public are not likely to tolerate much longer. As Mr. Joseph M. Walsh says, in his book entitled "Coffee, Its History, Classification, and Description," Philadelphia, 1894: "It is not too much to state that more than one-half of the beverage which masquerades and is sold under the name of coffee is unworthy of the appellation, and that the majority of the people of this country live and die without ever knowing the true taste of that delicious and exhilarating beverage." A "campaign of education" in this direction is now going on, and it is safe to say that whoever has become familiar with a superior brand will not go back to an inferior if he can help it. The American taste will mostly likely become more exacting rather than the reverse, and this means, of course, an increasing demand for mild coffee, such as our insular possessions are able to furnish.

In view of the public interest in this subject, it has been thought desirable to gather in one statement all the important facts bearing on the coffee industry, so far as they may be gleaned from sources accessible to this Bureau.

The statement is made to embrace, in addition to coffee, the companion beverages, tea and cocoa, because the production and consumption of the three varies sympathetically.

Historical sketch.

The ordinary coffee plant, *Coffea arabica*, is a native of Abyssinia, and in that country seems to have been cultivated and used as a beverage both in the wild and in the cultivated state from time immemorial. Thence it was carried to Arabia about the beginning of the fifteenth century, and the climate of that region seems to have suited it so well that Mocha came to be considered as its real home. From Arabia it was soon carried to all parts of the Mohammedan world by the Mecca pilgrims, who seem to have been delighted to find in it a happy substitute for the alcoholic beverages forbidden by the Koran. Its fame soon spread to the West. The first authentic mention made of it by a European is probably that of Rauwolf, a German physician and traveler, on his return from a tour through Syria, in 1573. It was brought to Venice by a physician in 1591. It is referred to in 1621 by Burton in his "Anatomy of Melancholy," as follows: "The turks have a drink called coffee, so named from a berry black as soot and as bitter, which they sip up hot because they find by experience that that kind of drink, so used, helpeth digestion and promoteth alacrity." However, it was only in 1652 that the first coffeehouse was established in London. In 1658 it is heard of in Marseille, but it was not till 1669 that it became fashionable in Paris through the popularity of Soliman Aga, chief of the embassy from Mahomet IV to Louis XIV.

Students of English literature and history are familiar with the importance which the coffeehouses almost immediately acquired in London as centers of literary and political discussion, in large measure supplying the place of the newspapers, which were then under rigid censorship. In France the progress of the new beverage was slower but steadier, while England gradually forsook coffee for tea. Though it was sold in Leipzig as early as 1694, the Germans seem to have become extensive coffee drinkers only about the time of the Seven Years' war.

For some time after its introduction into Europe all the coffee came from Arabia. In 1696, however, the Dutch succeeded in growing coffee trees in Java, from beans obtained in Malabar, India, and soon the Amsterdam market was filled with the Java product. From the Botanic Garden at Amsterdam a cutting is said to have been surreptitiously conveyed to the Botanic Garden at Paris, where it grew into a vigorous tree. In 1720 a slip from this was intrusted to an officer named Declieux (also spelled Declieus or Ducheux) to take to Martinique. During a long voyage this officer is said to have shared his daily ration of water with the precious plant. From this single slip are said to be derived all the immense plantations of the West Indies and Central and South America, with the exception of the Dutch West Indies, which had been supplied from Amsterdam direct in 1718. For some time the West Indies took the lead in coffee production, from which they have strangely declined. Java eventually outstripped them, to be in turn outstripped by Brazil, where the plant was in-

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troduced in 1754 by Father Villaso, a Franciscan monk, who cultivated it in the garden of the monastery of St. Anthony. At present Brazil supplies two-thirds of the world's coffee production. In the Philippines it was introduced in 1740 by Spanish missionaries, who had obtained the beans from Java.

Natural history.

In Asia and Africa many species of the coffee tree grow wild. They constitute a genus of the botanical order *Rubiaceæ* (madder). The French in their Sudanese possessions and the Belgians on the Kongo are making a study of the native varieties of coffee in those countries, of which new ones are constantly discovered, and it is safe to say that some of these will shortly have a decided influence on coffee culture. Wildeman (Les Cafétiers, Brussels, 1901) enumerates 79 species and varieties. Four varieties are cultivated—the Arabian species, *Coffea arabica;* the Peruvian species, *Coffea racemosa*, very similar to the preceding; the Liberian species, *Coffea liberica;* and the African species, *Coffea laurina.* A species of great promise, *Coffea excelsa*, was discovered in the Sudan in 1903 by the French Shari-Chad mission under Auguste Chevalier. It is a tree 45 to 60 feet high and produces a small grain of excellent quality. In Brazil, a variety called maragogipe has been cultivated for some time. It derives its name from the town of Maragogipe, in the State of Bahia, at the head of Bahia Bay, where it was first discovered. The reports regarding it are somewhat contradictory. Rossignon states that it is distinguished by the abundant crop; that the grain is much larger, with polished surface of silky luster and excellent aromatic qualities. It is found on a high plateau, and the planters consider its results so favorable that many have cut down their old plantations to plant maragogipe. An English traveler, cited by Arnold, speaks thus of maragogipe: "Its leaves are much broader than those of the ordinary Arabian coffee. It grows with extraordinary vigor, so much so that trees three or four years old reach a height of 8 to 10 feet and are laden with fruit. They reach their complete development much earlier than the ordinary types, and the bean is much larger. On the other hand, it appears that the weight of coffee produced in a plat planted in maragogipe is much larger than in an equal plat planted in ordinary coffee." The immense plantations of the Old and New World (Brazil alone is estimated to contain 530,000,000 coffee trees) are practically all derived from the specimens taken from Arabia first to India and thence to Java and elsewhere. In recent years a certain degree of attention has also been paid to the Liberian species, which has been found to be immune from various diseases that play havoc with the Arabian species. Its berries are much larger and the yield is more abundant, 2 tons per acre having been gathered from it. Its flavor is also said to be good, and, while some regard it as inferior to that of the Arabian variety, it must be remembered that the latter has been cultivated from time immemorial, while the cultivation of the Liberian species dates back only a few decades.

When one considers the marvelous transformations which the fruit of other plants, such as pears, apples, oranges, strawberries, and tomatoes, have undergone through scientific selection and culture, one may get an inkling of the new development in store for the coffee industry whenever the managers of coffee nurseries shall employ these modern methods. Hitherto this field has been almost entirely neglected. The numerous varieties that seem to have developed spontaneously under cultivation have not yet received scientific treatment. A beginning of such researches, however, has been made in Brazil and Guatemala, and surprising developments may be looked for when some horticultural "wizard" devotes his attention to the coffee tree.

The plant is a handsome evergreen tree, which sometimes reaches a height of 40 feet, but usually is not allowed to grow higher than 8 feet, being cut back to facilitate picking. Its leaves resemble those of the laurel, its flowers are white and exhale a delicious fragrance. The fruit in well-developed trees grows in clusters of a dozen or more. It resembles a cherry in size, form, and appearance, its color when ripe being a deep red like that of a cranberry. On dissection it is found to consist of six different parts: (1) The outer skin, very similar to that of the cherry; (2) a soft pulp adhering to the outer skin; (3) a soft, glutinous substance, strongly saccharine; (4) the parchment, a rather tough, yellowish-white covering, somewhat thicker than the husk of wheat; (5) the silver skin, a thin, whitish film, closely adhering to the beans and entering into their folds; (6) two beans lying with the flat side against each other. These two beans are the valuable part; all the rest is "hull," which is either

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thrown away or used as fertilizer, except in Arabia, where the dried pulp is an article of trade, being used to make a decoction called "kishre," resembling tea. Probably, as the profits of the coffee industry diminish, owing to the tendency toward overproduction, the producers will be compelled to use more economical methods of treatment, and it can hardly be doubted that some important use will be found for the "strongly saccharine" pulp of the coffee berry. As a fertilizer the waste is in high esteem, as it contains 85 per cent nitrogen, besides phosphoric acid and phosphates. The effects of it last two or three years.

Geographical distribution.

Coffee is a tropical plant, practically limited in its distribution to the parallels of 25° north and south latitude. Within that belt it grows at all altitudes, up to the line of frost. While it is said to thrive best at an altitude of 1,500 to 3,600 feet above sea level, it has been found in perfect condition at sea level, a fact which seems to indicate that mere altitude has little influence, the real causes of the observed differences being probably moisture, isolation, wind, and soil. A similar remark may be made regarding the question of shade, as will be seen further on. However, there is no doubt as to the superior quality of coffee grown in the mountains, as may be seen at once by a comparison of the different sorts in the market.

In one or other of its varieties, coffee is evidently indigenous to most of Africa. It has repeatedly been maintained that it was indigenous also to Arabia, India, and the Philippines, and even to such New World countries as Peru, Brazil, and Porto Rico. As regards Asia, this statement seems plausible, since birds, which, in addition to mammals, act as its distributors in Africa, might readily have carried it across the Red Sea and the Persian Gulf at an early age, supposing that its center of distribution lay in Africa and not in Asia. As regards the New World, the question is more problematic. The fact that coffee trees are sometimes found in localities not previously tilled or even visited by white men, is no proof that they were not derived from the specimens brought from Europe to America by human agency. The terms "monkey coffee," "jackal coffee," and "tiger-cat coffee," applied to coffee beans that have passed through the intestines of those animals, at once suggest the very rapid distribution which the plant must undergo the moment it is introduced and matures its luscious cherry-like fruit in a country abounding in these four-footed gormands. It is safe to say that if no more than a single coffee tree had ever been planted by the hand of man on the Western Hemisphere, its descendants would within a few centuries be found struggling with the native vegetation throughout tropical America.

The area where coffee is actually grown is evidently very small compared with the area where it might be grown. Even in Brazil, the main coffee-producing country, the coffee lands are mainly concentrated in four rather small States. The natural conditions are probably quite as favorable in the entire northern half of South America, in Central America, one-half of Mexico, three-fourths of Africa, one-half of Nearer and almost the whole of Farther India, New Guinea, and at least one-fourth of Australia. Of course it is not to be expected that in all these countries the industry will assume such proportions as it has in Brazil. If the comparatively small area planted in coffee even now yields an overproduction, it is evident that it will not admit of much greater extension. For every new tract successfully devoted to coffee raising, some less favored tract now planted in coffee will have to be devoted to something else. Only as the consumption increases through increase of population and prosperity can the total coffee area be extended. This consideration must be borne in mind in considering the proposition to raise our own coffee in our insular possessions.

Cultivation.

As may be gathered from what has been said of the geographic distribution of coffee, the plant thrives best in a hot, moist climate, at considerable elevation, in a rich soil. The rainfall should be from 75 to 150 inches per annum, well distributed over all the seasons. The drainage must be good, as the plant languishes in soggy ground. As the taproot is some 30 inches long, the drainage must extend to that depth. Where nature does not provide soil and moisture, fertilizers and irrigation have to take their place. Irrigation is practiced successfully in Arabia and Mexico. It must not be continuous but intermittent, because the air can not easily reach the roots through a water-soaked soil. It is

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found that by cutting off the water supply at the time the crop begins to ripen the berries become more perfect and the aroma improves. The need of an abundant and steady supply of water is due to the fact that the roots are mostly superficial, so that a drought quickly deprives the plant of nourishment. An impervious stratum within reach of the taproot is fatal, as no sooner does the taproot reach it than the tree falls off and dies.

In establishing a coffee plantation it is advantageous to select a tract covered with forest or brush which may be burned, contributing to the fertility by its ashes. In default of brush the ordinary weeds may be burned.

The young plants are obtained in three ways: (1) By using the seedlings that grow up spontaneously; (2) by sowing the seeds in nurseries and afterwards transplanting; (3) by sowing them in the places they are to occupy finally.

(1) The first of these three methods is largely followed in Porto Rico, to the great detriment of the industry, as it precludes anything like a selection of good seed, and often tends in the contrary direction, since the berries which are unripe at the time of the harvest or those sparingly produced by unhealthy or unfruitful trees are much more likely to have the opportunity of germinating than good and seasonably ripened seeds. The indefinite repetition of this process of reversed selection can bring about only a deterioration in vigor, fruitfulness, and uniformity of ripening, a fact which makes plain the necessity of the introduction of new stock in all countries where, as in Porto Rico, this objectionable method of propagation has been followed.

(2) Nurseries are in use in regions where there is not sufficient rain throughout the year to keep the young plants alive. Irrigation, therefore, has to be employed, and this is of course easier on the limited area of a nursery. Thoroughly ripe seeds are selected, deprived of pulp, but retaining their parchment. It is the practice to cover them with ashes, to make them easier to handle. In this state they are kept spread out in a covered and well-aired place. From the moment of picking to the time of planting not more than two weeks ought to elapse.

Too great care can not be exercised in the selection of seed. By extra efforts, no doubt, fine trees may be developed from poor seed, but it would certainly be more profitable to spend the same care on the best seeds in order to develop still finer plants. This is a maxim with which the farmers of the Mississippi Valley have long been familiar as regards wheat and corn; it has also been followed with the most gratifying results by the German coffee planters in Guatemala.

Nature's method of distributing the seed—through the droppings of animals that have eaten the berry and digested the pulp—may perhaps suggest an improvement in planting. It has been proved conclusively, in at least one case—that of the poison ivy—that the seed is distinctly benefited, as regards its germinating power and vitality, by passing through the intestines of its distributer, the crow. It seems reasonable to assume that all plants that depend for their distribution on the same agency are similarly benefited thereby. It would certainly seem worth while to ascertain by experiment whether by feeding the coffee berries to animals and planting the beans thus intestinally pulped, the germination of the seed and the growth of the plants might not be hastened and their vigor increased.

For the seed bed a patch of gently sloping virgin soil should be selected, warm and dry, soft in texture, and not richer than that to which the plants are to be subsequently transferred, but close to water—running water if possible. The seed beds must be somewhat shaded, but not so as to exclude the sun entirely nor so that the shading plant may gather rain and send it in streams upon the seed bed. The soil must be dug up to a depth of from 9 to 12 inches and made very friable, and at the same time slightly raised to promote drainage. The best time for planting is the autumnal equinox, which in the Northern Hemisphere is in September, in the Southern Hemisphere in March. The cooler season then approaching prevents the young plants from being scorched by the sun. The seeds are planted at intervals of an inch, in rows 6 to 9 inches apart, and lightly covered with mold. A cheap and effective shading may be secured by laying branches across a light framework of poles. All watering by sprinkling must be done in the morning or toward sunset. The young plants come up in about a month. When they produce from two to four leaves, exclusive of the seed leaves, they are carefully loosened and transferred, in damp, cloudy weather, to the nurseries and planted there from 9 to 12 inches apart.

In selecting a plat for a nursery care should be taken to have such command of water as to enable the soil to be thoroughly saturated. If this object can not

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be attained by erecting a tank or diverting a stream, the cheapest plan will be to transport the soil already prepared and lay it down to a depth of 1 foot to 18 inches on any land that has a good command of water. A couple of boys can effectually irrigate a large nursery if the water can be made to flow to each bed, while 20 men will be required to carry water where no such provision has been made. Moreover, the beds may be flooded at any time of the day, while watering pots can not be used except early in the morning or late in the afternoon. However, in flooding care must be taken not to allow the water to remain standing too long. During the hot weather the young plants should be shaded, which may be done by placing posts 4 feet high, with forked heads, at the corner of each bed, long sticks being laid across them from post to post, the whole being covered with grass or other material. Some months before the plants are finally set out this shade should be gradually thinned and finally removed, in order to harden the plants by gradual exposure to sun and air. Shortly before removal the plants should be stinted of water and brought to a standstill, for if they be transplanted with new and tender shoots they run great risk of being nipped off by the scorching rays of the sun.

In about a year,[a] or when the plants have attained the height of about 18 inches, they are ready for transfer to their permanent positions on the plantation, which has been meantime prepared for their reception. Here again rigorous selection of none but the best specimens has proved to be the most profitable in the long run. The German planters of Guatemala make it a rule to reject all plants that have not ten branches (cruces), no matter how promising they may otherwise appear. So far as possible the block of soil which contains the roots of the plant should be transferred with it without disturbing the roots. In certain model plantations in Brazil, as stated by Dafert, this object is attained by planting the seedlings taken out of the seed beds not in the bare ground, but in bamboo baskets filled with soil and set in trenches. These baskets can afterwards be readily lifted out of the ground and transferred to the holes prepared in the plantation. This method, though expensive at first, is stated by him to be the most economical in the end, as the loss in plants is thereby reduced to less than 1 per cent. Where this is not possible, the block containing the plant (en pilon in Spanish) is loosened by four cuts of the spade, lifted out, and transferred with as little shock as possible. Great care must be taken not to double up the roots, and if this is difficult in the case of the taproot, it is better to cut it short. The holes that are to receive the young trees ought to be prepared before the latter are lifted out of the nursery, so that they may not remain out of the ground longer than necessary. For fifteen to twenty days the transplanted trees are kept covered with brush to protect them against the sun, and the ground is kept covered with leaves to prevent too rapid evaporation. This, in fact, is a requirement to be kept in mind throughout the life of the tree, as the superficial character of the roots renders it very sensitive to drought. Those plants that do not survive the ordeal of transplanting must of course be replaced.

(3) When the seeds are planted in the open field at once, without the intervention of a nursery, it is customary to drive stakes into the ground at regular intervals and to plant several seeds in a hole at the foot of each stake. When the young trees are 12 to 15 inches high, the weaker ones are pulled up and only the strongest one is left standing. It is advisable to perform this operation gradually, pulling up the weakest first and allowing the others to take firm root again before pulling up the next. This method avoids the labor of transplanting, the risk of injury to the roots, and the setback which every plant experiences in being transferred to a new site; but of course it is practicable only where the humidity is sufficient to maintain the life of the young plants without irrigation, even during their tenderest stage.

The distance between the trees varies with the locality. On slopes they are planted closer together than on level ground. Some planters allow 10 feet between the trees, and others still less; others again contend that the interval should be 10 or 12 feet and that they ought to be carefully pruned in order to increase the vigor of the remaining branches and to afford free circulation of air and exposure of leaves and fruit to the sunlight. Where shade trees are not used, the tendency is in the direction of wider planting, 12 to 18 feet being the prevailing distance in Brazil. The quincunx arrangement, by which any three

[a] Mr. T. P. Welsh states that the coffee trees ought to remain in the nurseries for three years. Doctor Dafert says that in Brazil the unproductive period, which used to be three and a half to four years, has been reduced to one-half.

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neighboring trees form an equilateral triangle, is advantageous, in that it permits cultivation in three directions.

In deciding upon the relative desirability of different conditions and methods of culture, it may be found necessary to distinguish carefully between the yield by areas and the yield by individual trees. Thus in some localities thick planting and small returns per tree may bring earlier and larger profits than could be secured by wide planting with the necessary postponement of the maximum yield. If the matter were to be decided entirely on the basis of the yield of individual trees, testimony is well agreed that the most favorable conditions exist at elevations where a mild and equable climate renders shade entirely unnecessary, and a fertile soil sets no limits to growth. Thus in Java the largest trees are described as growing on terraced, carefully cultivated mountain sides with the slopes grassed over to prevent washing. The coffee is here planted 25 feet apart and permitted to grow to its full height, sometimes reaching 30 or 40 feet. These giant trees bore a crop which yielded 6 or 7 pounds of prepared coffee at a time when the general average for the Government plantations of Java was only half a pound per tree. On the rich volcanic soils of Central America similarly favorable conditions permit unusual size and yield to be attained without shade. Averages of 3 pounds per tree and upward have been recorded for unshaded plantations, while individual trees have been reported as yielding 12, 20, and even 40[a] pounds of coffee. One writer, who gave special attention to such exceptional cases in Mexico, reports as follows:

"Coffee trees will grow and produce more or less fruit in almost any soil where the temperature is not too low, but in order to obtain the best results it is necessary to select a rich, light, and deep soil in a locality where it rains at brief intervals during the entire year; and yet too much moisture is not good for coffee. Much has been said and written about the altitude above the sea level. My own observation has convinced me that the importance of this point has been greatly overestimated, because I have seen abundant crops of excellent quality produced at a very insignificant elevation, and I have seen the same results obtained at a very considerable elevation above sea level. * * * It is a fact worthy of note that all the coffee trees which I have known to produce very large crops have been permitted to grow freely without pruning the roots or the tree beyond taking off the suckers or sprouts, and they have been so far from any other trees that their branches did not come in contact with them. Some of these very productive trees have received no attention whatever except the gathering of the fruit, but as far as I am able to observe they have been entirely free from contact with other trees. Some of them have grown always in the shade of other trees, others without any shade whatever from other trees. It is very important in planting coffee trees that the roots should not be injured, although in many places it is customary to cut off the taproot at the length of 9 inches, and to cut off the top of the tree, but such treatment is sure to shorten the life of the tree, and hence the prevalence of the belief that the profitable life of a coffee tree does not exceed fifteen to twenty years. Yet I have seen trees heavily laden with fruit which were so old that no one in the vicinity knew when they had begun to bear fruit; but these trees had evidently been neglected."

The question of topping and pruning involves, of course, the same arguments in coffee culture that it does in grapevine culture and in other lines of fruit growing. Uncropped vines may doubtless be seen spread out over a great expanse and laden with grapes, yet no experienced vine grower will attempt to allow his vineyard to grow after that fashion. By experience it has been found that on the space covered by one vine growing without restraint many carefully pruned vines can be made to grow, and that the yield from these is larger and better. Modern coffee growers act on the same principle. Their aim is to direct the entire productive force of the tree, so far as possible, to the growing of fruit, and hence to restrict the formation of mere wood to the bare necessity of support for the fruit. All branches that show no promise of fruit are carefully removed.

"The first result of 'topping' (says Joseph M. Walsh) is to induce the growth of a number of shoots, the removal of which is termed 'handling' or 'searching.' The first to appear are vertical 'suckers' or 'gormandizers' from under the primary boughs; these are immediately rubbed off without injuring the bark. From the primaries spring secondary branches, in pairs, and at very short intervals. All such appearing within 6 inches of the stem are removed at once,

[a] Modern Mexico, March, 1899.

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so that a passage of at least a foot high is left in the center of the tree for the admission of air and sun. The fruit of the coffee tree is borne by young wood, and as the secondaries are reproduced when they are removed they are cut off as soon as they have borne; a constant succession of young wood is thus secured. In order that this may be regular, and to avoid weakening the shrub, the secondaries that grow outside of the central free space are left on alternate sides of the primary, their opposites being removed each year in turn; thus one is growing while the other is bearing. The one point in view must be the equal development of the tree and the yearly growth of as much wood as will bear fruit, but no more. Branches must not be allowed to grow into or cross each other, and if two or more secondaries spring from one spot the strongest only must be retained. Where a gap occurs tertiaries may be trained to fill it in the same way. When practicable the trees should be 'handled' twice before the crop, and the pruning should be commenced immediately after the crop and finished before the blossom comes out. When it is evident that a crop on a tree will exhaust it if allowed to mature, a portion of it must be sacrificed by pruning. The loss thus occasioned is more apparent than real, as in every prolific season much fruit is wasted for lack of labor and the trees are unreasonably overtaxed and bear poorly for some time after. Everything should be done to insure regular and even crops; the cuttings should be trenched in among the trees with manure, and no branch should be allowed to bear more than two or three crops before removal. Where coffee plantations have been neglected on this score, they must be very gradually reduced to proper condition by sawing out the branches and opening up the center of the trees in the first year and trimming out about half the remaining wood in the second year."

When a plantation is established on recently cleared land, it is important that all roots be removed and that the soil be frequently stirred, so as to exterminate certain grubs, very injurious to the roots of the coffee trees. It is advisable, for this purpose, in cultivating, to sprinkle the earth with naphthaline or carbon disulphide.

For some time other crops, such as corn and beans, may be raised between the coffee trees. When this is not done the orchard must be weeded two or three times a year, either by tearing up the weeds or cutting them off with a knife. They should not be burned or removed, but spread about the trees, so as to serve as a mulch to keep the ground moist and also eventually to fertilize it by their decay.

After three years a small crop may be gathered, but a full crop can not be expected before the fifth year. Some trees produce less than a pound a year, others 6 to 8 pounds. Though old trees produce less fruit, it is said to be of better quality. When an orchard grows too old it may be renewed by simply cutting down all the old trees and allowing the young shoots from the roots to grow again.

In many countries it is customary to plant in coffee orchards larger trees intended to shade the coffee trees. Whether such shade is beneficial or harmful to the coffee tree is a question still under debate. Nearly all the reports from Porto Rico state that shade is there indispensable. On the other hand, in Brazil, which produces two-thirds of the world's coffee, no shade is used. The question has been well treated by Mr. O. F. Cook, special agent of the Department of Agriculture ("Shade in Coffee Culture," Bulletin No. 25, Division of Botany). As regards quantity of yield, he finds that individual trees produce most abundantly without shade. As to quality, the production without shade of Mocha coffee and the now equally prized Blue Mountain coffee of Jamaica, to say nothing of other high grades of East Indian and Brazilian coffees, shows that the claim that shade is a necessity to the production of coffee of good quality is not to be taken seriously. He thus arrives at the conclusion that any benefits which the so-called shade trees may confer are probably indirect, namely: (1) Protection against drought; (2) protection against erosion; (3) shelter from wind; (4) fertilization of soil by fallen leaves; (5) nitrification of soil by root tubercles of leguminous trees. He suggests that all these effects (except protection from wind) might perhaps be attained without the injurious effect of shade by the use of some leguminous plant which, like the Florida beggar weed in the orange groves, will keep down the grass and add fertility to the soil.

The German planters in Guatemala, whose plantations are regarded as models of scientific management, have arrived at the conclusion that above 3,500 or 4,000 feet (depending on local conditions) shade is not beneficial, but that below that altitude it is indispensable.

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The trees most commonly used for shade are the bucare (Erythrina) and the guamo (Inga). The former is chosen for its rapid growth, and because it sheds its leaves about the time for gathering the crop; but its shade is rather too dense and the brittleness of its wood causes it to offer little resistance to the wind. The guamo is of slower growth, but is less liable to injury by hurricanes.

F. J. Madriz, writing of Venezuela, says that shade is necessary in hot land to prolong the life of the tree and to sustain it during the long drought from October to April or May, five or seven months, when plants with superficial roots suffer severely. He recommends the bucare, or fire tree (so called from its abundant red flowers), especially because it sheds its leaves just at the time of flowering, in March, so that the flowers have the benefit of sunlight. Its leaves are also good fertilizers, beginning to decay as soon as they reach the ground. By covering the ground they prevent evaporation during the time from flower to fruit.

Bananas and plantains are planted very generally with coffee. In some regions they are employed for the temporary protection of the young plants while the permanent shade trees are still small, but it is also customary in parts of Mexico and Central America to maintain bananas throughout the life of the coffee, with or without other shade. In the extremely rich and deep volcanic soils of Central America this system may be permissible, but under ordinary conditions it is probable that the banana is not a desirable shade plant, and many intelligent writers emphatically condemn it as exerting a distinctly harmful competition with the coffee. Mr. T. P. Welsh, who spent considerable time in Mexico, states that no first-class planter in that country would think of planting bananas among his coffee trees. Analyses in Venezuela, reported by Doctor Delgado, indicate that from a given area planted to bananas or plantains the fertilizing materials annually drawn from the soil are nearly twenty times those required for coffee in full bearing, and it is accordingly claimed that secondary shade by means of bananas should not be employed, even for a few years, since it hinders the growth of the young trees and induces a debility from which they never fully recover. In Porto Rico many plantations are smothered with bananas to an extent obviously harmful, the young seedlings having opportunities for only the most spindling and weakly existence and requiring many years to attain even to the meager fertility with which their owners seemed to be satisfied.

The popularity of bananas as shade for coffee is probably largely due to the value of the fruit, which, even though produced incidentally and not exported, furnish an important part of the food of the laboring population in Porto Rico and other coffee-producing regions.

In such regions many peasants and small farmers derive a large part of their subsistence from the bananas, while the small amount of coffee obtainable is still sufficient to supply their slender needs in the way of imported articles. The culture may be a success from their standpoint, but this is no indication that the method is adapted to commercial production which will yield a profit after the expenses of hired labor and management have been covered.

It may be added that as a shade tree the banana is also objectionable because, unless planted so thickly as to smother the coffee, a part of the latter is exposed while the remainder is too densely shaded. The tall varieties are also liable to be blown down in heavy winds and often fall upon and injure the coffee trees. The large leaves may also keep the rain off some trees while pouring torrents upon others.

In Porto Rico bananas are often planted indiscriminately among the coffee, though some planters arrange them in alternate rows. This is altogether too close to permit a normal growth of the coffee, which never attains proper stature or productiveness. In Mexico and Central America it is customary to run from two to six rows of coffee between the rows of bananas. The middle rows of coffee under this arrangement are but little shaded, and the trees are larger and more fertile than those which stand nearer to the bananas, showing that the effects of the latter, if not negative entirely, are confined to the general protection against wind and drought.

If for any reason the planting of bananas with or near coffee is found to be desirable, the utility of the dead stems and leaves as manure should not be overlooked. These may be used as a mulch. The so-called "trunk" is in reality a bundle of the sheathing bases of the succulent, herbaceous leaves, and retains its moisture for a long time, usually until thoroughly decomposed.

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According to Gomez, it is customary to bury the stems and leaves of the banana about coffee trees in the vicinity of Uruapan, in the State of Michoacan, Mexico. These may also be collected and allowed to decompose in trenches or piles, and with proper handling are said to yield a manure rich in nitrogen, potash, lime, and phosphoric acid, and thus particularly valuable for coffee.

A Queensland experimenter claims good results from the planting of rice for shading the young coffee and protecting it from the wind. The rice paid nearly all the expenses of preparing the land and planting the coffee. After removing the grain the straw was used as a mulch and the coffee is said not to have suffered but to have been advantaged by the rice, the growing of which also helps to keep down the weeds.

The coffee plant is subject to various diseases. The most destructive is that caused by *Hemileia vastatrix*, a microscopic fungus which at one time nearly ruined the coffee plantations of Ceylon, where it first became noticeable in 1870. It has also made its appearance in Java and elsewhere. It attacks the leaves, producing yellow stains, soon turning black. Under the microscope these stains are seen to be covered with an orange-colored powder, which readily drops off. The stains gradually enlarge until they occupy the entire leaf, which then shrinks and falls off. The extremities of the stems then die and the berries fall off. Generally the plant puts forth a new set of leaves, but if these are again attacked and destroyed, the plant rarely survives. It appears that the fungus had long ago been observed in Ceylon and Sumatra, but without doing much harm. Some unusual combination of circumstances seems from time to time to lend it special virulence, when it nearly ruins the plantations. Sulphur fumigation and acids have been tried without satisfactory results. The fact that it attacks plants in exposed situations and on dry soil, while it spares those in sheltered places and moist soil gives color to the theory that the best preventive is to keep the plant in prime state of growth by abundant irrigation and manure.

Another enemy of the coffee plant is the leaf-miner (*Cemiostoma coffeellum*) of Jamaica, Porto Rico, and elsewhere in America. In Brazil the injury done by this pest is said to have amounted to one-fifth of the coffee crop. The unwelcome creature is a small moth, whose minute, almost microscopic larva burrows in the middle layer or soft tissue of the leaf, leaving the upper and lower surfaces uninjured, except that the cells die and form large, irregular brown spots, having exactly the appearance of vegetation scorched and shriveled by heat. The insect appears not to attack the Liberian coffee. One way to exterminate it is to pick off and burn all the diseased leaves before the escape of the larvæ, but this of course is very tedious. Care should be taken not to allow the pest to be introduced.

Dressing for market.

The coffee berries ought not to be gathered until they have assumed a dark-red color, verging on brown. If gathered at an earlier stage, when they are bright red, the aroma is less rich. This is apt to be the result when the picking is done by the job, as the pickers are then anxious to fill their baskets as quickly as possible, and take ripe and unripe berries indiscriminately. In up-to-date plantations the berries are conveyed to the curing house by running water in galvanized-iron spouting.

In Arabia it is said to be the custom to shake the trees so as to cause the fruit to fall on cotton sheets spread beneath. In this way only mature fruit is harvested.

Before it can be sold the coffee has to be freed from the various envelopes that surround the two beans. This is done in two ways, the dry and the wet.

(1) The dry way is the old way, in use in Arabia and in some parts of America, where the planters are too poor to use improved machinery. The berries are exposed to the sun's rays in layers 5 or 6 inches deep on platforms or terraced floors, called "barbecues." These paved barbecues are raised a little above the ground and inclosed with an upright stone ledge 8 or 10 inches in height, and divided by transverse partitions, with four or more square compartments, that each may contain a day's gathering. During the first and second days the berries are turned often that the whole may be more exposed to the sun, but when they begin to dry they are frequently winnowed and laid on cloths to preserve them better from rains and dews, still exposing them to the sun daily and removing them under cover every evening until they are

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sufficiently dried. By this means the pulp ferments in a few days, and having thus thrown off a strong acidulous moisture, dries gradually in about three weeks; the husks are afterwards separated from the seeds in a mill. The Arabs do not remove the dried pulp before eighteen months, and, as previously noted, use it to make a beverage.

Although sun-dried coffee is really the best, the conditions in tropical countries are such that sun drying is inapplicable to large quantities. The progress of the industry is inevitably in the direction of machine-dried coffee.

The natives of Ceylon pound the dried berries in a mortar to free them from their coverings. This primitive method, by which many beans are broken, has almost everywhere else been replaced by machines called hullers, in which the dried berry is "threshed."

(2) The wet way, or "West India preparation," is the modern method in use on all the improved plantations. It effects the removal of the pulp by washing and maceration. The berries are first thrown into a vat filled with water, the lighter and worthless berries floating on the water and being constantly removed, while the heavier berries at the bottom are drawn off through a pipe and carried to the pulper (despolpador). In this machine an iron cylinder set with teeth faces a curved sheet of metal, which the teeth strike as the cylinder revolves. A stream of water carries the berries between the cylinder and this sheet, where they are crushed and the pulp loosened and the two beans of each berry are separated. They are then conveyed to a vat some distance off, the water being kept agitated by a revolving wheel and serving to remove the loosened pulp, which is carried away by the waste water, the beans sinking to the bottom of the vat, from which they are taken to a strainer, which drains off the water.

The berries are now free from pulp, but still covered with the glutinous substance adherent to the parchment. To remove this they are placed in a cistern and allowed to ferment for forty-eight hours. This softens the glutinous substance, which is then removed by washing, leaving the "parchment" exposed. The parchment, as may be remembered, is the outer and tougher of the two pellicles covering each bean. In this condition it is next dried, either in the sun or by artificial heat, on large zinc-covered tables with raised edges, under which steam pipes are run. They are constantly stirred and removed as fast as dried. In this state they are sometimes sold in the market under the name of "parchment coffee" (café en pergamino). They are often left purposely in this state for some time, as their quality is thereby improved; but if left too long the silver skin becomes difficult to remove.

To remove the parchment various machines are used, but the principle is essentially the same, consisting of five operations: (*a*) The beans are crushed in such way as to break the dry parchment, but leave the bean uninjured; (*b*) a fan blows away the fragments of parchment, leaving the beans; (*c*) the beans are assorted by sieves and hollow cylinders pierced with holes of different sizes, this operation being necessary for the purpose of uniformity in roasting; (*d*) they are freed from their last covering, the silver skin, by constant shaking, trituration, and fanning; (*e*) lastly, they are picked over by hand to make sure that no imperfect specimens or foreign bodies remain. Afterwards the beans are dried again. Some planters say that drying must be continued till the bean resists the pressure of the thumb nail. Much skill is needed to prevent loss of weight from overdrying or loss of color from underdrying.

When freed from all its coverings, the coffee is said to be "in grain" (en grano or en horro. The spelling en oro, occasionally found in reports from Spanish America is probably an orthographic blunder, induced, perhaps, by the yellowish tinge of some varieties of coffee). It is now ready to be put in sacks and sent to the market.

Unroasted coffee is said to improve with age, so much so that the term "Old Government Java," meaning the coffee which the Dutch Government retained for a long time before selling, came to designate the highest quality. The reverse is true of roasted coffee, which quickly loses its aroma. Hence the roasting is delayed, so far as possible, till the last moment before selling to the consumer. The best results are obtained, of course, when coffee can be ground as soon as roasted, and consumed as soon as ground. This, however, would necessitate roasting by the consumer himself, who has neither the skill nor the appliances to secure the best results. If the heat be too great or too long applied the product is burned, losing most of its aroma and acquiring a bitter taste; if the heat be not sufficient or continued long enough the aroma is not sufficiently developed. Thirty seconds too much or too little may mean

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a spoiled roast. Owing to this fact the roasting business has been gradually concentrated in the hands of a few firms employing experts, who by long practice are able to conduct the operation so as to develop the qualities of the coffee to the best advantage. The aim is, of course, never to roast more than can be immediately sold and consumed. To some extent the loss of aroma of roasted coffee can be avoided by glazing, which is done by scattering powdered sugar over the hot beans. The sugar melts immediately, giving to each bean a fine glaze, impervious to the atmosphere so long as it is protected from moisture. This protection is secured by storing in tightly closed tins or jars.

As an effect of roasting, coffee loses 12 to 16 per cent in weight, but gains 50 to 60 per cent in bulk. The roasting largely destroys the characteristic outer marks, so that the different varieties are far more difficult to distinguish in the roasted than in the unroasted condition. The main object of roasting is to make the constituents more soluble by the bursting of cells. While raw coffee yields 25 per cent of its matter to solution, roasted coffee yields 39 per cent. By the process of roasting, the beans acquire a remarkable power of absorption, as the consumer but too often learns to his sorrow when he finds that his coffee tastes of petroleum, tar, etc., having absorbed the odors of these substances in the grocery store, sometimes over a considerable distance. This illustrates the need of careful packing of the roasted beans.

[From The Commercial Philippines in 1906, page 17.]

COFFEE.

Coffee is at present an inconsiderable item in the export trade of the Philippine Islands, or, indeed, of their production. Prior to 1890 it was an important and remunerative product of certain provinces and constituted a source of considerable wealth in the sections in which it was cultivated. In 1890 coffee ranked fourth in order of magnitude in the export trade of the islands, and did not fall below tobacco in the value of its exports, having been in 1890 7.4 per cent and in 1889 7.1 per cent of the total exports of the islands. Subsequent to 1890, however, the devastation of the coffee plantations by insects and disease caused a rapid diminution in the quantity produced and exported, but there is reason to believe that the same energy and scientific methods applied by the Dutch in Java to the protection of their coffee from insects and disease and a reestablishment of their coffee area might bring about a large coffee production in the Philippine Islands. The quality of the coffee of the Philippines is stated as especially fine, comparing favorably with that of the comparatively near-by island of Java. Coffee was brought to the islands by Spanish missionaries during the latter part of the eighteenth century, and its systematic cultivation commenced early in the nineteenth century.

The possibility of the reestablishment of this industry in the Philippines is discussed by the Manila Daily Bulletin in its special annual edition of August 5, 1906, in which it says that natural conditions in the Philippine Islands for growing coffee are perfect and unexcelled elsewhere in the world, and notwithstanding the collapse of the islands as coffee producers, the fault is not that of the country but of those engaged in production. Java was, until 1880, it says, the second largest coffee-producing region of the world; then came the same disease as that which a little later swept the coffee plantations of the Philippines as if by fire, and at a single blow struck the production of Java coffee from a surplus of 165,000,000 pounds to barely enough for home consumption. The Dutch planters, interested in the maintenance of their plantations, brought scientific and careful treatment to bear upon the existing conditions of blight by insects and disease, and have so far reestablished their coffee industry that it now reaches an annual output of nearly 40,000,000 pounds and commands the highest prices in the markets of the world. The Dutch producers of coffee in Java solved the problem by planting disease-resisting varieties of coffee, and have largely effected the restoration of their industry without recourse to other and more difficult and serious attempts to hold in check the disease by application of sprays or other methods of this character. Similar methods applied in the Philippines would, it is believed, result in the reestablishment of the coffee industry, while the large area known to be available for successful coffee growing suggests that the Philippine Islands may, with proper attention, be able to produce a considerable share of the 75 to 80 million dollars' worth of coffee imported into the United States each year.

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RICE.

[From Census of Philippine Islands, 1903, vol. 4, p. 86.]

The production of rice of many varieties, though greatly lessened as compared with former years, is an important branch of Philippine agriculture. The grain is the principal article of food of nearly the entire native population and is cultivated more or less extensively in all provinces.

In former years its cultivation was and had been from time immemorial the principal industrial occupation of the people. It was the only cultivated crop, as far as can be ascertained, produced by the natives when the islands were first discovered by the Spanish explorer, Magellan, in 1521, and for upward of three centuries subsequent to the establishment of Spanish sovereignty it was the principal product. For many years surplus crops were produced and the grain was exported in large quantities, but as the production of more profitable crops, such as hemp and sugar, increased, the cultivation of rice diminished, and from becoming an article of export it changed to one of importation, as the population and their food requirements increased.

In 1857 import duties on rice were abolished; since then and for some years prior thereto the deficiency in home production has been made good by importation, although small quantities have been occasionally exported.

It may be said that, as a rule, the falling off in the production of rice has not resulted in any great loss to the population, except when resulting from drought or locusts, as that portion of land and labor formerly devoted to its cultivation was subsequently used for the production of more profitable crops.

A clear indication is gained from the above table of the extent to which the islands are dependent upon outside sources for this staple food of the people. In 1878 the value of rice imports was 8.7 per cent of that of all imports; during 1880, 1881, and 1882 considerably smaller quantities were imported, but in 1883 the per cent was 7.7 and in 1884, 15.3 of the total value of imports. In 1889 the percentage had risen to 21.2, after which there was a heavy diminution in the imports, until in 1895 the percentage was only 1.7 of the total. Since American occupation the annual imports of rice have far exceeded those of the preceding years, and in 1902 amounted to over eight and three-quarter millions of dollars and were 26.4 per cent of all imports. The enormous increase since 1898 is largely attributable to the lack of carabao, which have been slain by thousands by the rinderpest, without which the natives are unable to prepare the ground for the crop; to devastation of the growing crops by locusts; to recurring outbreaks of ladronism, and visitations of cholera, which at different times since 1898 have raged with very fatal results throughout nearly the whole of the archipelago.

Cultivation of Rice.[a]

[By Regino Garcia, Bureau of Agriculture.]

Rice is said to be indigenous in southern Australia and in India, to have been under cultivation in India from the earliest times, and to have been introduced into China nearly 3,000 years B. C. Whether it was brought to the Philippines from either of these countries, or whether it is an indigenous plant, is an unsettled question. But whatever its origin, the Spaniards on their arrival found it under cultivation generally, and it is one of the most important products of the islands.

[a] This paper was most voluminous, and in order to adapt it to the general character of the census report it was necessary to condense it.—*Director.*

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Although deficient in nourishing qualities, as compared with some other articles of food, its great digestibility and palatability render it very valuable, especially in the Tropics, where it constitutes the principal article of food of millions of people.

There are many species of rice, which are commonly divided into two general groups and known as lowland, or irrigated-land rice, and upland, or mountain rice. The scientific division made by botanists includes many species, varieties, and subvarieties. Repeated experiments made between 1867 and 1873 in the botanical gardens, Manila, threw much light on the various species, varieties, and subvarieties of rice in the Philippines, and the names by which they are known in the different provinces.

Of the 152 kinds which have been recognized, the following are the more important:

Irrigated, or lowland rice.—Macan, macan sulucan, macan bunut, macan sulung, macan munti, macan sonson, macan bocaue, malagquit puti, malagquit pula, mangasa, mangasalit, pinorsigue, binanbang, pirurutor, ganados, bodlilising, binanquero, binsolores, dimulong, sinanpablo, etc.

Unirrigated, or upland rice.—Pinursigui, guinarayon, lactansangley, pinurutum haba, pinitod, guinamalig, binusisi, mangasi puti, mangasa-pula, pinagocpoc, guinanda pula, guinanda puti, bolibot, dinumoro, quiriquiri, binoliti, quinabibi, dinulong puti, buntodcabayo, tinuma, magapilay pula, mangola, tanqui, aguyot, agap, pinorsigui tapoyoc, bolalaque, castano, quinastila, sinantol, tinumbaga, quinaaco, quinandila, quinastilla-malit, quinanpilan, sinanpaga, calivo, manunbalay, inoropol inopot-ibon, pinuray, quinalabac, etc.

Of the total number collected in the Philippines about 35 are varieties and the remainder may be regarded as subvarieties.

Heat and moisture are prime essentials in the cultivation of rice, which thrives in all southern countries and grows even as far north as latitude 45°. Its cultivation is carried on in the Philippines at elevations of 5,000 feet, as in the mountains of Benguet and other parts of the Igorrote country.

While rice under careful cultivation will grow on any soil adapted to other cereals, a moist, sandy loam is most suitable.

Cultivation consists in the preparation of the soil and the subsequent planting and care of the growing crop.

These operations differ somewhat according as the rice is lowland or upland. The former is practically grown under water supplied by irrigation, while the latter is cultivated on the hills and mountains where irrigation is often impossible and the plants must depend on the annual rainfall for the necessary moisture.

In either case the preparation of the soil consists in clearing the ground of trees, brush, etc., which are used as fencing, and in constructing a sufficient number of earthen dikes or ridges to control the water of irrigation or the rainfall. Where the fields are irrigated an intake and outlet enables the operator to regulate the depth of the water, as well as the flow, which should be constant so as to avoid stagnant pools of long standing.

Lowland rice is grown under water, the plants being raised in seed beds. The ground for the beds is turned over two or three times with a plow in 10 or 15 centimeters of water, until the bed is very well formed.

The seed is then soaked in water for twenty-four hours and sown broadcast, but very thickly.

When the plants begin to grow, it is customary to sprinkle them with a solution of lime to protect them against insects, and when they have attained a height of from 26 to 38 centimeters they are transplanted in the ground previously prepared for the purpose, care being taken that the roots of the plants be exposed to the action of the air for the shortest period possible.

The preparation of the soil for lowland rice consists in working it with a plow, when it is thoroughly saturated with water, being covered by at least 10 centimeters thereof. A harrow is passed over it to level the ground, mixing it with water, and forming a muddy mass. The working is repeated in an opposite direction, with colters in narrow furrows, in order that the soil may form a mass thoroughly soaked with water, the harrow being passed over it once more before the transplanting takes place.

In places where the soil is not of a moist character, artificial irrigation is absolutely necessary.

The field is kept under water until inflorescence appears, the land being flooded every three or four days in order to keep the plants always fresh. When

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they blossom and the fruit heads, irrigation is suspended and the ground left dry, in order to hasten the ripening of the fruit.

About 135 pounds of unhulled rice are necessary for a hectare of land. It is necessary to remove the weeds growing in the rice fields, which is done by turning them under into the mud, where they rot very quickly and contribute thus to the richness of the soil.

The preparation of the soil for upland rice consists in plowing the ground during the first rains, harrowing or crushing it and raking off all refuse. After it has been exposed for a few days it is plowed again, and if necessary it is given a third plowing. As soon as the rainy season is well on in the locality, the unhulled rice is sown broadcast, care being taken to scatter it evenly.

Another method of planting, called *cainguines*, is resorted to and consists in dropping from three to five grains of unhulled rice in small, shallow holes about the width of a hand apart. The operation is described as follows: About the first rain many people gather in the field with long bamboo poles, the small end bent with a sharpened piece of bamboo firmly fastened to it. This tool is held almost vertical and with bent part forward. When it is brought down the spring of the bend helps to raise it again and also to throw out some dirt, thus leaving a small hole in the ground in which the women and children drop the seed rice and cover it. The bamboo pole is kept going rapidly and as the top end is split, every time it is brought down the split pieces come together with a loud noise amid the shouts of the people. It seems more like play than work and can be heard for miles around. For planting of this kind one chupa of rice is needed for every square meter of ground.

Before planting, all kinds of rice should be soaked in lukewarm water for twenty-four hours to facilitate the swelling of the cotyledons and assist germination.

The crops of early rice having been sown in May, at the beginning of the rainy season, are harvested between August and January, according to the kind of rice, the spikes being cut when they have attained a length of 50 centimeters.

They are then tied in bunches and allowed to remain on the field until dry, when they are gathered.

Lowland rice is also sown in May, when the lakes and streams are bank full and irrigation made easy. It is harvested not later than October.

Immediately after the harvest the ground is again prepared for a second planting, not later than January, according to the kind of seed. Rice requires from three to four months to bring it to maturity.

Where mills are not to be had for thrashing, the stalks are thrown on a bamboo mat of sufficient size and trampled and turned with the feet until the grains have become completely separated from the stalks and hulls. The straw is then removed and the grain is fanned in order to remove the particles of peduncle and calyx, leaving only the well-ripened grains. In the warehouses, where rice is cleaned for the market, a mill and fan are used.

After rice has been fanned it is placed in a wooden mortar and pounded in order to remove the fine chaff, called in the Philippines *binlig*, and used as food for hogs and horses.

The pounding is done with heavy wooden pestles, which can be easily handled in the mortar, or by large wooden mallets which, with moderate blows, leave the rice very clean and lustrous.

After pounding, the rice and chaff are separated by sifting through large shallow baskets with a small bamboo edge and bottom.

Two cavans of unhulled rice will yield 1 cavan of cleaned rice, or 1 cavan of ordinary rice and 4 gantas of binlig, which, at 6 pesos for the former and 40 cents for the latter, give a total of $6.40. The cost of cleaning rice is 70 cents, and, supposing the cost of transportation to market to be 25 cents, the owner makes a profit of $5.70 per cavan of rice.

The rice mill in Binan, in the province of La Laguna, charged 28 cents for cleaning 2 cavans of rice, which yield 1 cavan of cleaned rice.

The rice mills of Bautista (Pangasinan) and of Calumpit (Bulacan) clean from 400 to 500 cavans per day.

Among the enemies of the rice plant which cause much damage are very small coleoptera, whitish or reddish, which generate in the soil when it is perfectly dry, and, perching upon the plants, leave them drooping and yellowish, preventing their perfect development. There are also some greenish worms which devour the entire leaf, and a bug which, when fully developed, hops about on the stalks and destroys the stamens, with the result that many of them fail to fruit, though the husks may be developed fully. A remedy against

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the first named, if the land be subject to irrigation, is to flood it thoroughly in order to exterminate them, or to irrigate with water containing a solution of lime, which also will exterminate the worm. In the case of the bug, bonfires are made on the embankments at night, and are quite efficacious, as the insects are attracted by the light and are burned up.

Birds called *mayas*, which usually come in large flocks, cause much damage to the rice stalks while they are fruiting. Field scarecrows are a good protection against them.

The greatest enemy to most of the gramineous plants are the locusts, and no amount of precaution or of active campaigning adequately protects the plants against these pests. The methods employed at the present time for the extermination of the locusts may be included in two groups, viz, those which are intended to prevent the development of the egg, and, secondly, those which tend to destroy the perfect insect or the larvæ. One of the methods employed to prevent the hatching of the eggs consists in plowing the land in which they are deposited, not only because the plow destroys a large number of them, but also because they are brought to or near the surface, where they may be easily exterminated by the use of barnyard fowl or hogs, which eat them with great relish. Of course this is done before planting.

In order to kill the locusts while in the grasshopper stage the fields are sometimes surrounded with a number of men who close in toward the center, beating upon the ground with branches, sticks, or other suitable implements until the insects have been completely exterminated. Large rackets may also be used, but they should be thoroughly beaten before being used again.

Another method is to light bonfires and make a great noise with bells, kettles, and other objects, all the inhabitants of the town gathering where this devastating insect appears.[a]

AMOUNT OF THE CROPS.

The principal rice-producing islands and provinces in the Philippines are Pangasinan, Nueva Ecija, Pampanga, Tarlac (northern part), southern part of Zambales, Bulacan, Cavite, La Laguna, Batangas, Camarines Sur (the greatest producer in southern Luzon), the Visayan Islands, Capiz (island of Panay), and Negros. Other islands and provinces of the archipelago cultivate rice, but only for local consumption, and a few supply themselves from neighboring provinces, especially from Manila.

The province of Pangasinan until 1868 exported large quantities of rice to China, and considerable shipments left Manila for the neighborhing colonies. Until the year 1874 the value of a cavan of rice in Camarines, Pangasinan, the high towns of the provinces of Tarlac, Nueva Ecija, and southern Zambales was from 2 to 2½ pesos, according to class. Even in the year 1899 rice sold in Pangasinan at 2 pesos Mexican per cavan, and the mills in Bautista and Calumpit had their granaries and warehouses overflowing with bunches of unhulled rice and many thousands of sacks of cleaned rice. There were years when the crop was so abundant that there was not sufficient labor to carry it from the field, even though each laborer was given one-third of the amount which he could cut per day, and the rice was abandoned in the fields for lack of labor. This has occurred in the extensive fields of the province of Ambos Camarines, which at the present time is paying exorbitant prices for rice, and also on the plains of the Poponto, between Pangasinan and Tarlac.

In the irrigated lands of the province of Pangasinan, 80 cavans of rice may be gathered from 1 cavan of seed; in dry lands, 50; and in highlands of the third class, at least 40 to 60.

The most fertile farm of the Philippines is that of Imus (Cavite), of which 13,442 hectares are devoted to rice cultivation, and its soil is of the best known, with good irrigation canals, for which reason the crops give excellent yields. It has an area of 18,000 hectares, having 4,480 of the first class, each one yielding an average of 100 cavans of rice per cavan of seed; 4,480 of the second class, yielding approximately 75 for 1; and 4,482 of the third, with a yield of 50 for 1. There remains, furthermore, 4,558 hectares, of which one-half are suitable for upland rice, and would yield from 30 to 60 cavans for every cavan of seed, according to the present condition of fertility. The plantations of San

[a] These and all other methods appear to have failed during the last plague of locusts, which totally destroyed the crops in many localities.—*Director.*

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Francisco de Malabon, Naic, and Santa Cruz de Malabon, of the same province, are also productive.

The rice plantations in the province of Bulacan, and the towns of southern Pampanga, and of Rizal, yield, according to class of soil and irrigation, from 25 to 40 cavans of rice per cavan of seed. Some of the land is exhausted on account of the constant cultivation; nevertheless, some of the fields in the municipalities of central Luzon, which are frequently watered by the great overflow of the rivers, usually yield 60 cavans of rice for 1 of seed.

In the province of Batangas the irrigated land yields from 30 to 40 cavans of rice to 1 of seed, and the uplands from 15 to 30 for 1 of seed.

The irrigated rice land of the province of Ambos Camarines yielded from 60 to 100 cavans for 1 of seed, and the dry lands from 30 to 50.

In the province of La Laguna there are lands which yield 80 cavans for 1 of seed, even though their method of irrigation is very primitive. This is due to the fact that the soil here is very suitable for the cultivation of rice. On the other hand, at a short distance therefrom, on the Calamba plantation, which has good irrigation canals, the yield is only 60 cavans for 1 of seed in 2 crops—that is, 35 in the first and 25 in the second—for the reason that the soil is quite sandy and more suitable for growing sugar cane.

In the municipalities of the vast plain in the southern part of the province of Zambales the land most suitable for the planting of rice will yield as much as 50 cavans for 1 of seed, and in other lands more sandy only 25 cavans for 1 of seed.

In Pampanga, where the greater part of the soil is quite sandy, notwithstanding the fact that the rice fields are favored by the rains, the yield is only from 20 to 25 cavans for 1 of seed.

In the island of Mindoro the irrigated land yields from 30 to 40 cavans, and in the dry lands, commonly called *Calanan*, as much as 70 cavans are harvested.

The classes of rice cultivated in the province of Cavité are the following: *Daliquit*, *pulan-balat*, *kuinanbic*, and *binaba*, the last two being glutinous, commonly called *malagquit*. These four classes are early varieties, which are sown broadcast during the first rains of May and harvested in the middle of September, as is also the variety called *quinanga*.

The other later varieties of dry-land rice which are harvested in October are the following: *Quinastila*, *quinamalic*, *quinarayon*, *binocaue*, *binolong*, *inabac*, *calimbin*, *pinalapa*, *dinalaba*, *binaguntao*, *inanot*, *sinaba*, *mimis*, and the glutinous *piroroton-dila*, *macabunot-dila*, and the *malagquit*, called *matpunit*.

The irrigated land varieties harvested in December are those called *macan pinò*, *macan laque*, *macsalec*, *quiriri*, *malagquit-dinolores-morado*, and the much desired *binanquero*, which is the rice which can be stored in a warehouse for five years while the others can hardly be kept two.

The varieties of rice in the provinces of Bulacan, Batangas, and Ambos Camarines have already been cited, as have also some cultivated in Cavite.

The varieties of rice in the provinces of Pangasinan, northern Nueva Ecija, and northern Tarlac, are called: *Ganado*, *ambalang*, *ganado ampote*, *matayosa*, *galaygay*, *macabontoc*, *sagat*, *bililisin*, *inomatis*, *mimis*, *obanang*, *simpolet*, *inandusa*, *cavitena-paaga*, *pinila*, *binolaney*, *botoleno*, *pinella*, *dinominga*, *damasco*, *asingan*, *inanteresa*, *sinan Jose*, *bandig-goden*, *inagamang*, *mantica*, *mantica ampote*, and *mantica arem*, and the glutinous varieties *malis*, *bato*, *dinagupan*, *pogot*, *calsibon*, *sinotla*, *malsitin*, and *nilanca*, most of which come from Ilocos and are bearded varieties.

There are also many varieties of rice in the southern part of the province of Zambales. They are the following: *Bulagsac*, *sinanglay*, *panay*, *cumabibi*, *dinorado*, *bacayab*, *binondac*, *quinolapo*, *pinosigui*, and the fragrant varieties *quinapitan*, *quinolantro*, all of which are early varieties. *Inocupa* is a glutinous rice, also early, as are the bearded varieties called *lampangan* and *mamreng*. There are others which are harvested later called *binarit*, *ipot*, and *tayaring*, which are sometimes sown broadcast and at other times in seed beds for transplanting, and the Ilocano varieties, *caviteno*, *mantica*, *salayusay*, *mimis*, *inanduran*, *daldal*, and *sampirit*, and the late irrigated land varieties, *macan* and *binucaui*, which is as fine as the *mimis*, and the bearded *balayan-manticalay*.

In closing it may be said that the main hope of the farmer in planting is to reap a good crop, and consequently he must avail himself of all the means within his power to that end, such as the preparation of the soil, the selection of good seed, the care of the plants, and, above all, that there be no lack of water for irrigation, especially in sandy soil, where there is constant filtration.

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COST OF PLANTING AND HARVESTING.

The custom existing in the Philippines in the cultivation of various agricultural products, including rice, when a partnership is formed or laborers are hired, is to make an agreement by which the latter usually takes one-half the crop or its value, after all expenses have been deducted, either in kind or money.

Up to 1896 the principal expenses which the owners of rice fields were obliged to defray were the following, per hectare, in local currency, the Mexican dollar:

For wages for plowing, weeding, etc	$2.00
For planting	5.00
For taking the sheaves of rice to the stack (mandala) and hulling	2.50
Total	9.50

For the cutting it is customary to give the cutters, according to their needs, a fourth or fifth of the number of sheaves, according to size, cut per day.

If a contract be made for cutting the rice, it is customary to pay $0.50 to $0.75 per thousand bundles, of which the first yield is 2 chupas of unhulled rice and the second 4 chupas.

In other provinces contracts have been made to pay 3 pesos per hectare of land for preparing the ground suitably for the planting of rice and 1 cavan of seed and 6 pesos per hectare for harvesting.

At the present time, wages being high, it is thought that for preparing the land, sowing, and transplanting the rice the cost would be 15 pesos per hectare, more or less, and the cutting according to agreement and as may suit the grower.

These expenses vary according to the different provinces and the scarcity of labor.

Rice is very largely consumed in Great Britain, nearly 330,000 tons, valued at 2,690,000 pounds sterling, being imported into England in 1889.

The colony of Victoria (Australia) imported 5,738 tons, valued at 80,997 pounds sterling, during 1887. The exports from British India during 1886 have been valued at 9,000,000 pounds sterling, according to Dr. G. Watt. The sweet rice, called *amc* in Japan, constitutes a delicacy, as do all kinds of glutinous rice, called *malagquit* and *pirurutom* in the Philippines.

At the present time the rice annually imported into the Philippine Islands amounts to 375,784,891 pounds, representing the large sum of $4,178,921 gold, while but twenty years ago, more or less, rice was exported from the Philippines to neighboring colonies.

Cultivation of rice in Pampanga Province.

[By M. Cunanan, Pampanga.]

The cultivation of rice is more advanced in Pampanga, relatively, than in the other provinces of the archipelago. The life of the population depends upon its cultivation, being, as it is, its principal food. It is not meant to convey the idea hereby, however, that at the present time the cultivation of rice is at its highest state, because none of the modern agricultural machines is in use here, such as the drill, which dispenses with so much manual labor, or the reaper, which cuts and gathers the harvest so rapidly, or the thresher. Indeed none of the improvements used in agriculture, and which are real evidences of progress, are employed.

The following varieties cultivated in this province may be selected from the large number of known varieties of this plant, and are divided into two classes: (1) *Dinalaga, quirinrin, milagrosa, mimis, dinala, gangpulut, macapungul, ynatsupal, sinampaga, lacatan,* and *quinulantro;* (2) *sinanpablo, binumduc, pilingbelto, matavia, inaplaya, macanpina, palacaya, calibo, pinulsigui, pane,* and *quinuayan.* These two principal groups represent the irrigated and unirrigated rice or lowland and upland classes.

The varieties mentioned in the first group are cultivated in localities where there is neither artificial irrigation nor natural irrigation produced by periodical inundations. This quality of rice requires much less care than the varieties of the second group. A very moist soil is essential; that is, a soil which has been inundated at least for a part of the year, but on the other hand

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is subject to the changes in the season. The seed is sown broadcast upon the ground, which has been suitably plowed and harrowed.

The varieties of the second group are sown in the same manner as those of the first group, with the exception that they are generally placed in seed beds, whence they are transplanted in the respective fields, which must be plowed and harrowed until they are converted into a species of marsh or muddy swamp. The preparation of ground for the cultivation of this rice consists in making squares of different sizes, which are formed by heaping up the earth in small dikes. After this has been done the soil is plowed and harrowed with a harrow composed of thorny bamboo called *balsa*. After the ground has been harrowed the square is filled with water and the transplanting takes place from the seed beds. The latter are similar to rice paddies. Planting begins early in June, and after it has been done no work or care is necessary but to keep the paddies covered with water in order to secure abundant crops. The harvest begins, as a rule, early in December and is gathered with a sickle the same as wheat.

Two crops a year are harvested from irrigated lands in some sections of Pampanga. For the first crop the seed beds are prepared in February and March, transplanting takes place in April, and the crop is harvested in September. For the second crop the seed beds are prepared in August, transplanting is done in October, and the crop is gathered in February. After the first crop has been removed, one month is allowed to pass, during which the ground is cultivated before transplanting the second crop. It should be stated that the seed bed consists of a small section of land one-twentieth or one-thirtieth the size of the field in which the transplanting is done.

THRESHING.

When cut, the heads are left in the fields for some days, and are then gathered into sheaves and removed to the threshing place. Usually the threshing is effected by means of mares or carabao; otherwise two stakes are planted upright and joined by a piece of bamboo for support, and the grain threshed out with the naked feet. After the grain is threshed and the chaff separated, the latter is saved and fed to stock. When the grain is free from the chaff it is stored in granaries (usually constructed of bamboo and nipa, although there are many of stone and lumber). The rice crop in Pampanga in normal years has amounted to 1,800,000 cavans.

The price of unhulled rice at the place of production is from $0.75 Mexican to $1 per cavan (75 liters), and for hulled rice from $1.75 to $2 Mexican per cavan in normal times. The cost of cultivating 1 hectare of land, sown broadcast, is about $41; planted from seed, $49 Mexican.

The dry lands yield a more substantial and finer flavored rice, but the yield is less certain and less abundant.

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[Farmers' Bulletin No. 3.]

MODERN RICE CULTURE.

By WILFRED J. BOUDREAU.

LETTER OF TRANSMITTAL.

BUREAU OF AGRICULTURE,
Manila, P. I., August 15, 1902.

SIR: I have the honor to transmit herewith for publication as a bulletin of this bureau a manuscript on modern methods of rice culture.

Rice as an article of food occupies the same position in the Philippines that wheat does in America and Europe, and it is eminently proper, therefore, that its culture should receive considerable attention from this bureau. Especially is this the case when we take into consideration the fact that 375,784,891 pounds are annually imported into these islands, representing an aggregate of $4,178,912 gold, and that this sum of money could easily be kept in this country for its industrial development if rational, up-to-date systems of rice culture were introduced.

Respectfully,

WILFRED J. BOUDREAU,
In Charge of Rice and Cane Investigations.

F. LAMSON-SCRIBNER,
Chief of Bureau of Agriculture.

INTRODUCTION.

The cultivation of rice in the Philippines is in many respects similar to that practiced in China, Japan, India, and other oriental countries. It is true that plows are more generally used here than in these latter countries, but they are such primitive affairs and the work performed with them is so unsatisfactory that, economically considered, they are of very little more value than the mattock and the spade. The main operations, however, such as preparing the seed beds, transplanting, puddling the soil, and harvesting the crop all conform to the oriental type and are such as characterize all countries where labor is cheap.

So cheap is labor in some of these countries that a man's wages for one year are $15 gold and board. Consequently a farmer has very little inducement to invest money in labor-saving machinery, and it is questionable whether it would be advisable or even practicable, to make a radical change in the rice culture of China and Japan. Most of the lands suitable for rice growing are already utilized for that purpose, and so dense are the populations that it would be next to impossible in these countries to produce sufficient food to maintain the present inhabitants and the necessary draft animals if modern farm machinery were introduced. Besides, the use of labor-saving machinery would result in throwing a large portion of the people out of employment and thus entail widespread suffering and hardship. In addition to this it may be said that the fields are not properly laid out for the use of modern agricultural

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FOOTNOTE.—The following illustrations accompanying this report are on file in the War Department: Fig. 1, a light steel-beam plow; fig. 2, a heavy wooden-beam plow; fig. 3, a two-furrow gang plow; fig. 4, a three-furrow gang plow; fig. 5, a disk harrow; fig. 6, a spring-tooth harrow; fig. 7, a smoothing harrow; fig. 8, a rice drill; fig. 9, an ordinary scoop or road scraper; fig. 10, road scraper in operation; fig. 11, rice sickle; fig. 12, cradle for harvesting rice or other grain; fig. 13, reaper and binder for harvesting rice; fig. 14, harvesting rice in Louisiana; fig. 15, thresher; fig. 16, traction engine.

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implements. The majority of the fields are small, irregular strips of land, divided from one another by levees, which have been constructed at great cost of time and labor, and before gang plows, disk choppers, and twine binders could be introduced it would be necessary to throw these levees down.

In the Philippines no such obstacles exist. The population is comparatively sparse. In a territory equal in extent to the whole of New England and the State of New York there are only some six or eight million people. The consumption of rice greatly exceeds the production, notwithstanding the fact that there are extensive areas distributed throughout the archipelago which are admirably adapted to the growing of rice. Indeed, the natural conditions for the production of this crop are so favorable that it would not be surprising to see the Philippines become, within the next ten years, one of the leading rice-producing countries of the world.

It was stated above that no obstacles exist to the introduction of a new system of rice culture in this country. We may go further and say that it is absolutely necessary that it should be done. Ever since the occupation of these islands by the American Army four years ago the price of labor has steadily increased, and as American customs are gradually introduced we may look forward to a further advance. It is needless to say that every industry will be profoundly affected by this, and the rice industry will be one of the first to feel its influence, for it is a crop which must be grown cheaply in order to be profitable. To pursue the same system of cultivation as in China, however, and to have to pay three and four times as much for labor is out of the question. Hence the rice farmer will have to adapt himself to the new condition if he wishes to compete successfully with foreign rice, and it is with the view of outlining a new system that this bulletin is published.

Of course it will take time before the methods indicated can be carried out in the remote provinces. There are difficulties to be overcome, chief among which is the question of draft animals, but that a revolution in rice culture is inevitable there can be no doubt, and the sooner it is realized the sooner a beginning will be made.

In concluding these preliminary remarks, a few words might be said with advantage in regard to cheap labor and labor-saving machinery. Cheap labor is by no means the cheapest article on the market. In support of this statement the following figures are submitted: The labor of a Filipino in the rice fields of the Philippines has been estimated at $20 gold and board per annum. The amount of land which he can cultivate is 2½ acres, yielding 1,500 pounds of paddy. In Texas or Louisiana, on the other hand, a laborer receives $200 gold and board, but he cultivates 80 acres of land, and the cultivation is so superior that with irrigation water alone he produces 160,000 pounds of paddy. In short, he receives ten times the wages, but he produces one hundred times more rice than the Filipino laborer.

It is not claimed that such results can be obtained in the Philippines. This is a question which can only be definitely settled in the field, and as soon as possible practical work will be undertaken to determine exactly to what extent local conditions may modify the results obtained in Louisiana and Texas.

SOILS SUITABLE FOR RICE GROWING.

Any fairly fertile soil that has sufficient clay to retain the moisture will grow rice. Generally speaking, lands which will produce cane, cotton, and corn will produce rice, and, where a system of rotation is followed in the cultivation of these crops, rice can be made a part of the system with advantage. It does not follow, however, that cotton, cane, or corn will grow well where rice will thrive. On the contrary, the best rice lands are those which have an impervious substratum of clay, and, ordinarily, such lands are not very well adapted to sugar, corn, and cotton culture.

In selecting a site for a rice farm—we shall speak of lowland rice only for the present—rolling lands should be avoided, as it is impossible to flood such lands economically. The greatest expense in the cultivation of rice is the one connected with the construction of levees, and the amount of leveeing depends altogether upon the topography of the country. Perfectly level land presents ideal conditions for rice culture, because the "cuts" may be made as extensive as one may desire, the limit being the amount which can be planted in two or three days. A larger field would be impracticable, because the rice would not all germinate at the same time. The advantages of large cuts over small ones can not be exaggerated. Not only is the expense of leveeing very

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much reduced, but the amount of unoccupied land is not so great, and there is not so much likelihood of the fields becoming infested with weeds, as these levees are veritable weed nurseries. Furthermore, if the nature of the soil permits, twine binders can be more profitably employed than in small cuts.

When the land slopes, on the other hand, the size of cuts depends altogether upon the grade. Rice will not thrive well in more than 8 or 10 inches of water, and if the land has a slope of, let us say, 3 inches to the acre it will be necessary to construct the levees every 2 acres, since 4 inches of water on the elevated end of the field will flood the rice to a depth of 10 inches at the lower end. Therefore the more the land slopes the nearer the levees have to be, and finally a limit is reached when gang plows and other implements can not be used, as every turn at the end of the cut represents a loss of time and money.

There are two other factors which should be considered in selecting a site for a rice farm, and these are irrigation and drainage. No one can undertake the cultivation of rice and afford to ignore them, and they are of such primary importance that they will be discussed under a separate heading.

PREPARATION OF THE SOIL.

The breaking of the land should begin as long before planting as possible; for, inasmuch as water remains on the soil during the whole period of growth of the rice crop, the micro-organisms which are responsible for nitrification whereby soluble nitrates are provided for the plant, remain dormant, if they be not totally destroyed, for lack of oxygen, and for this reason the land should be plowed as soon as possible after the first crop is gathered, in order to give the soil a thorough airing.

The breaking up of the soil can be effected with any ordinary steel plow, but where it is desired to grow rice on a large scale gang plows are more economical. There are different makes of these implements, but they are all constructed on the same principle and consist essentially of a broad plow or a number of smaller ones hung on a frame and wheels. With one of these and three or four mules a man can do five and six times the work in one day that he could do with an ordinary plow, and three gang plows are all that are needed to plow up a 500-acre farm.

The depth to which the soil should be plowed depends upon local conditions, and no general rule can be given that would be applicable to every case. For some soils plowing 5 or 6 inches deep gives the best results, whereas in other cases 3 or 4 inches are reported to give as satisfactory crops as deep plowing. In all old rice fields, however, the probabilities are that an artificial hardpan exists as a result of the shallow plowing which is practiced, and in such cases the land should be plowed deeply the first year, so as to permit of better underdrainage and in order that the roots of the plant may penetrate the soil more deeply in quest of food.

After the land is broken up it should be pulverized with a disk chopper and smoothing harrow to prevent the land from baking and to put it in such a condition that it will retain moisture. If the land is not too heavy, the disk chopper will not be necessary, any heavy harrow being sufficient.

PLANTING.

There are two ways in which rice may be planted. It may either be sown broadcast or it may be planted with a drill. Both methods are extensively used, but the best authorities advocate the use of the drill. Rice planted with the drill, it is claimed, will germinate more uniformly, and this is an important point in the cultivation of rice. Besides, when the land is grassy it is an easy matter to hoe and weed the rice if it has been drilled, whereas if it were sown broadcast the operations would be very much more difficult.

The seed may be sown to the depth of 2 inches in May and June and at the rate of 2 bushels to the acre. When the soil is very dry, a roller should be dragged over the field so as to compact the ground, thereby increasing the capillary power of the soil and thus causing moisture to rise from below. Should water be available, however, a better plan is to apply a sufficient quantity of it to saturate the soil and to pass a light harrow over the field as soon as it is sufficiently dry.

DRAINAGE.

Although rice is a water plant, good drainage is as essential in its cultivation as it is in that of any other crop. If the land will not admit of thorough drainage, it will be impossible to prepare the ground properly, and in consequence the

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stand will be poor and the yield of the crop very much diminished. It is generally believed, too, that when rice approaches maturity the water should be withdrawn from the land, so as to permit of the formation of a good, heavy head. Rice can unquestionably ripen in water, but the character of the seed is very much affected for the worse thereby, and in milling such a crop it will not give as good an article of commerce as it would have given if the water had been withdrawn at the proper time.

It is in the harvesting of the crop, however, that drainage is most important. It matters not whether the rice is harvested with a reaper and binder or a sickle the field should be dry, so as to permit of the shocking of the rice in the field where it falls. So far as shocking rice in mud and water is concerned, that is absolutely out of the question, and to have to carry it to the levees, as is now done, is too slow and expensive a process.

IRRIGATION.

Of equal importance with drainage is the subject of irrigation. Unfortunately, the conditions are so favorable for the growth of rice during the rainy season that very little has been done to utilize the water supply by the large number of streams which traverse the country in every direction. Usually the rain water is sufficient to mature one crop, and the river water, which contains a large amount of silt and soluble plant food, has been permitted to flow uninterrupted to the sea.

The western farmer and the sugar planter of the Hawaiian Islands know what a difference irrigation makes in the yield of their crops, but such results are not as remarkable as those that are obtained in applying irrigation water to rice lands. In certain portions of Louisiana and Texas rice has been grown on some lands for a number of years, and they continue to yield nearly as much rice now as they did the first year they were cultivated, although the only fertilizer applied during the whole of this time has been irrigation water. Even here in the Philippines, where the yield of rice per acre is in the neighborhood of 600 pounds, lands have been made to produce 2,000 pounds with the help of irrigation.

We need not go far to find the reason for this. It is a well-recognized fact that no matter how rich in plant food a soil may be, the plant unaided can not assimilate any of it. By a wise provision of nature most of the plant food in the soil is stored in the form of insoluble compounds, and as such they can not be leached out by rain water. Before the rootlets of the plant can absorb this plant food it is necessary that it should be in soluble form, and this chemical operation is performed mostly by low forms of plant life, commonly known as bacteria. As was noted above, however, these special bacteria will thrive only in the presence of oxygen, and as rice lands are under water for a great part of the time the work of the bacteria is suspended, and consequently the supply of soluble food in the soil ceases to increase under these conditions, and unless the young plant is supplied with food from some other source it can not be expected to reach perfection.

Irrigation supplies this extraneous food, and although there may be but little fertilizers in the water, such an immense quantity of water is evaporated during the growth of the rice that a large amount of nitrogen, phosphoric acid, and potash are given up to the plant.

Another reason why irrigation should be employed in preference to rain water is because its temperature more nearly approaches that of the ground than does the temperature of rain water, and this is a point recognized to be of a good deal of importance.

Finally, by means of irrigation water two crops of rice could be grown on the same land in the course of a year and the yield of the land thereby doubled.

DITCHES AND LEVEES.

The most economical way of digging ditches and constructing levees is to make use of good, strong plows, scoops, and grading machines. With a plow, a scoop, and a pair of mules a man can do as much work in a day as he could do in two weeks with a spade. Where the operations are to be conducted on a large scale and the planter can afford to purchase a road machine, it would be

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well for him to do so, as it is very useful in making the main channel or canal for conducting the water from the water supply to the field.

In building the levees around the different cuts the aim should be to make them broad and sloping rather than steep and narrow. The reason for this is that the former levees facilitate the use of agricultural implements.

A good plan is to plow a ridge 6 or 8 feet wide where the levee is to stand, and harrow down. As soon as it rains, plow up again, always throwing the dirt to the center, and continue this process until the bank has attained a sufficient height, usually 18 to 20 inches.

The question of utilizing the water supply, constructing reservoirs, dams, lifting water from rivers, etc., is too large a one for present discussion, and it will be made the subject of future bulletins.

TREATMENT OF THE CROP.

Should no irrigation water be available, as soon as the rice is 4 or 5 inches tall all the drains in the levees are to be closed so as to retain the rain water, and if the season is favorable sufficient water will be caught to keep the grass smothered and to mature the rice. In no case should the water completely cover the rice.

Where irrigation is practiced, enough water to saturate the soil may be applied when the rice is 2 or 3 inches tall, provided it stands in need of it. This will give the crop an early start, and this is important, for in the struggle for existence with the grass rapid growth in the rice is all important.

In the course of three or four weeks the rice will be 7 or 8 inches tall, and water may be turned on to the depth of 4 inches. As the rice grows, more water should be added until it stands about 8 inches deep.

When possible it is well to keep the water in circulation, as it prevents the growth of certain grasses which thrive in stagnant water. This can be done by permitting a certain amount of water to escape at the lower end of the field and supplying a corresponding amount at the upper end.

Ordinarily no further attention is necessary until the crop is ready to be harvested, but should weeds spring up among the rice plants they will have to be pulled, and occasionally the rice becomes so grassy that all growth ceases and the plant assumes a yellow color. In such a case there are only two remedies—either more water must be admitted so as to completely submerge the grass, or, if the rice is too small to permit of such a treatment, the water must be completely withdrawn and the field mowed down. The rice, by virtue of the rapidity with which it grows, when mown down will soon outstrip the grass, and by flooding at the proper time the crop can be saved.

There should very seldom be an occasion for such heroic treatment, however, on a plantation which has sufficient irrigation water, because, with a proper system of control, the grass can nearly always be completely covered with water and thus smothered out.

Within ten or twelve days before the grain is ripe the water should be completely drained off. The time to draw off the water can be easily ascertained by noticing the color and position of the heads and the consistence of the grain. As the rice begins to ripen the heads assume a drooping position and they take on a pale straw color. As above noted, the grain, too, is a good guide, for on breaking it it will be found to be of the consistency of dough.

HARVESTING.

The harvesting of the rice crop is an operation which can be performed either with the sickle, the cradle, or the reaper and binder. Whenever it is possible to use a reaper and binder one of the greatest expenses in rice growing is reduced to a minimum. With the use of this machine and 6 mules a man can reap from 8 to 12 acres a day. Unfortunately, it is not every field which can be reaped with a twine binder, and its use on any given tract of land is determined by three conditions: First, the land must be susceptible of thorough drainage: next, an impervious substratum of clay must underlay the land; and finally, the harvesting season must be moderately dry. Without these three conditions the twine binder is impracticable. The machine is a heavy one, and unless the ground is dry it will sink so deeply as to be very heavy to pull. In addition to

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this the drive wheel becomes so clogged with mud and bits of straw that it slides along the ground instead of turning, and, in consequence, the knives are stopped.

Whether the physical condition of the soil will permit of the general introduction of this valuable machine in the rice fields of the Philippines is an unsettled question. The bureau has a reaper and binder among its collection of agricultural machinery, and a thorough test of its efficiency will be made as soon as practicable.

Where it is not possible to make use of the twine binder, sickles and cradles are employed, the rice being cut with about 2 feet of straw and tied in bundles about 6 inches in diameter. Some 25 or 30 of these bundles are shocked together and a few bundles placed on top of the shocks to protect the grain from too much sun and from the depredations of birds.

THRESHING.

The machines employed in threshing rice are practically the same as those used in the wheat fields of the western United States. Their capacities range from 40,000 to 90,000 pounds of paddy per day, and it can readily be seen that a small farmer does not stand in need of a thresher for his exclusive use. Not only this, but in the United States the cost of a threshing machine, including engine, is $1,200 gold, and it is only persons of some means, even in America, who can purchase them.

In order to overcome this difficulty it is customary for some person to buy a machine and charge the farmers so much per sack for threshing their rice. The threshers are portable and are hauled from place to place by the traction engines, which furnish the power for operating the threshers. In case a farmer has only 50 or 100 sacks, however, he has to haul the rice in the straw to the machine, because it is not profitable to move the thresher unless it can do a day's work in one place.

Rice threshing is a very profitable business in the United States. As much as $75 net per day is earned by some threshers, and although the rice industry may not have recovered sufficiently from the recent troubles to warrant their introduction in the provinces just now, we can see no reason why threshers situated at central points should not prove profitable in the near future.

FERTILIZERS.

In determining the kind of fertilizers and the quantity which should be applied to a soil in order to grow any given crop, one of the most essential things to know is the composition of the plant, for by knowing this we get a good idea of the fertilizing materials which the crop extracts from the soil, and thus we are able to supply this drain judiciously.

The average analysis of the rice plant shows that every 100 pounds of the grain contains 1.19 pounds of nitrogen, 0.321 pound of phosphoric acid, and 0.16 pound of potash; and 100 pounds of the straw contains 0.756 pound of nitrogen, 0.26 pound of phosphoric acid, and 0.42 pound of potash. Therefore an acre of land which produces 2,000 pounds of paddy and 4,000 pounds of straw will lose a total of—

	Nitrogen.	Phosphoric acid.	Potash.
2,000 pounds paddy	23.80	6.42	3.20
4,000 pounds straw	30.24	10.40	16.80
Total	54.04	16.82	20.00

With these figures we should be able to form a fair estimate of the amount of fertilizer to apply to rice land. But from this a deduction in the amount of nitrogen to be applied may be made for the nitrogen which is brought to the soil in rain water, and where irrigation is practiced a deduction may be made not only in the amount of nitrogen, but also in the phosphoric acid and potash. What this amount is it will be impossible to say until chemical analyses are

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made of the waters of the principal rivers and streams of these islands, and it is to be hoped that data in reference to this matter will be available in the near future.

Just in what form to apply fertilizers to rice lands is another question to be considered. Rice is so peculiar in its habits of growth that the matter of fertilizing it is very much more complicated than is the case of ordinary crops. As was noted above, nitrification is an impossibility in a field of growing rice which is under water, consequently the application of any but soluble fertilizers will give no immediate results, and such soluble fertilizers as sodium nitrate and water-soluble phosphates are so high priced that it is questionable whether they will ever be extensively used. The only practical scheme that can be suggested just now is that the land be fertilized and fallowed or that a system of rotation such as is practiced in Java be introduced. By rotating the crop with corn, leguminous plants, cane, and cotton, not only is it possible to fertilize the land and increase the subsequent yield, but noxious weeds can be either totally destroyed or at least greatly decimated.

VARIETIES.

The number of distinct varieties of rice is variously estimated at from 1,400 to 3,000. Whether there are even so many as 1,400 or whether the same variety bears different names in different localities is not known. It is very well recognized, nevertheless, that varieties play an important part in the color, shape, size, taste, yield, and maturity of the grain, and too much care and judgment can not be exercised in selecting seed. Many of the good effects of efficient cultivation will be lost if an inferior variety of seed is planted, and there are certain varieties of rice which are so poorly adapted to the milling process that great financial losses are incurred in cultivating them.

In certain parts of the United States where Honduras rice was formerly exclusively grown this loss was so great that seed rice was imported from Japan with the view of obviating this defect in the Honduras, and the Japanese rice gave such satisfactory results, not only in the greater resisting power which it possessed in withstanding the breakage of the mills, but also in the yield per acre, that larger quantities were imported the following year, and now the Japanese rice is cultivated very extensively.

Some of this Japan rice has lately been imported by the insular bureau of agriculture and is now being distributed to the farmers of the islands.

UPLAND OR MOUNTAIN RICE.

This rice, as its name implies, is cultivated where the land is too rolling to practice flooding. Large amounts of it are raised in these islands, and in certain districts where the valleys are narrow and level lands are scarce mountain rice constitutes the principal article of food of the natives.

In regard to its cultivation, very little need be said more than has already been stated in regard to lowland rice. The cultivation and harvesting of the crop are practically the same as for flooded rice, excepting that no provision need be made for leveeing. The only difference between the cultivation of the upland and the lowland rice lies in the fact that the former has to be frequently hoed and weeded, because there is not water on the land to smother the grass.

CONCLUSION.

In conclusion we wish to reiterate that there is no reason why scientific methods of culture and modern agricultural implements should not make the Philippines one of the leading rice countries of the world. It was not many years ago when the rice industry in Louisiana was on the same footing with the rice industry of the Orient and yet such a revolution has been effected in the cultivation of rice in that State within the last fifteen years as has not been accomplished in Chinese rice culture in six thousand years.

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APPENDIX.

IMPLEMENTS AND DRAFT ANIMALS REQUIRED TO CULTIVATE A 500-ACRE FARM.

For the information of those readers of this bulletin who may be interested in the matter, the following statement relative to the number of draft animals and kind of machinery required to cultivate a 500-acre rice farm, together with the cost thereof in United States currency, is appended:

	Number.	Cost.
Mules	20	$3,000
12-inch gang plows	3	135
Disk harrows	3	60
Smoothing harrows	3	45
Twine binders for harvesting	3	450
Thresher and traction engine	1	1,250
Total		4,940

The thresher can be made to thresh the rice of 1,000 or 1,500 acres, so that if anyone should wish to cultivate that amount of land it would only be necessary to purchase 40 or 60 mules and the proper multiple of machinery stated for a 500-acre farm, exclusive of thresher.

The gross receipts for the crop of a 500-acre farm will vary in the United States from $15,000 to $20,000 gold, according to the amount of red rice found in the paddy.

[From Report of the Philippine Commission, 1905, vol. 3, p. 121.]

Rice imported into the Philippine Islands during the fiscal year 1905, by ports.

Port.	Pounds.	Value.	Duty.
Manila	344,027,583	$4,504,494	$797,446
Cebu	143,835,971	1,947,769	335,505
Iloilo	66,092,797	863,252	153,830
Jolo	4,946,934	77,172	13,614
Zamboanga	4,170,239	59,786	10,460
Bongao	189,560	2,908	406
Balabac	72,262	1,357	235
Total	563,285,346	7,456,738	1,311,496

[From Report of the Philippine Commission, 1904, vol. 2, p. 495.]

TRANSPLANTING RICE.

The natives universally start their rice in seed beds in June and July; they prepare their land as fast as they can by plowing and harrowing in mud until the middle of October, and as fast as they get a piece clean, set the young rice about 9 by 9 inches. This plan is well-nigh universal in oriental countries. The reason for this plan, no doubt, grew out of the fact that, by setting rice 6 weeks old and 10 inches high in freshly cleaned land, it more easily keeps the mastery over the noxious grasses and weeds. Then, with rice of such height, irrigation water can be put on the land much earlier and deeper, and thus keep the weeds and grass down. With the slow and faulty way of preparing the land, practiced in the islands, it is quite likely that rice seeded in the American way at the beginning of the wet season would make but little crop.

We have fully tried the native's plan of setting rice, having put in several hundred acres in this way. We find that $1 gold will take up the plants and transplant an acre. We also have several hundred acres seeded in the American way, which are in every way promising. The transplanting enables us to lengthen the planting season by six weeks.

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The rice farm has about 25 horses and mules for doing its work, besides some breeding mares and ponies. It is found that horses and mules can stand work here fully as well as in the Southern States of America. With us, four mules and one native teamster break 4 acres of land a day. With the native farmer one man and two carabaos break 1 acre in five days. The reason for having two carabaos is that a carabao must spend half the time wallowing in mud and water, and, hence, two must be had so as to change every hour or two. The native plow is a small affair, cutting about 4½ inches.

So the native's weak point and great waste of time is not in the transplanting of rice—there are women and children enough to plant the whole islands—but it is in the ridiculously slow method of preparing the land.

With some Chinese oxen with which we have been experimenting, four oxen and a native plowman have been able to plow 2½ acres a day. These oxen can work ten hours a day without suffering from heat. We have tried them in the mud, and they appear to do as well as carabaos. These cattle can do so much more work than carabaos that with them there will be less necessity for plowing in mud, as so much more of the work can be done before the land gets muddy. The oxen seem to resist disease much better than carabaos and get their living from grazing almost as well.

[From Report of the Philippine Commission 1906, vol. 2, p. 46.]

MURCIA RICE FARM.

The rice farm at Murcia, Tarlac, having served its purpose in an experimental way and not being suited to the raising of rice on a commercially profitable scale on account of the barrenness of the soil and the rolling nature of the land, has been discontinued, but not before results of great importance to the rice growers between Manila and Dagupan were obtained. The advantages incident to steam threshing were first demonstrated at this place, and as a result a considerable number of steam threshing outfits have been purchased and are now in operation.

The wisdom of the Filipino in sowing his rice in seed beds, and transplanting it after it has attained a considerable size, has been conclusively demonstrated. His land is poorly prepared, and if his rice is scattered broadcast over it the young seedlings are promptly killed by coarse grasses and weeds, whereas the larger plants at the time of transplanting have a sufficient start over the weeds, so that they are able to hold their own. The trouble with this method, however, lies in the amount of labor necessary to plant a comparatively small area. It was found that by sowing rice in drills 15 to 20 inches apart, so as to facilitate weeding, crops could be obtained which were nearly as heavy as those secured by transplanting. If the rice is drilled in, large areas obviously can be planted during the comparatively short season.

It has been found that crops planted in May or June ripen no sooner than those planted in August or September, but that the early plantings give a vastly better yield than do the later ones. It now seems probable that, with artificial irrigation, seed might be put out at least a month earlier than is the general practice at present, without maturing a crop before the close of the rainy season.

There is little doubt that the Philippine rice fields would yield 25 per cent more than they do at present were they kept clear of grass and weeds during the growing season, and circular letters have been sent to the governors of all important rice-growing provinces calling attention to the necessity of convincing the farmers that they should weed their rice. A number of governors have displayed a keen interest in this matter and have not only issued proper instructions to municipal officials, but have themselves gone to inspect the rice fields and urged the people to keep them clean.

It is hoped that a sufficient number of planters will interest themselves in this matter to at least give numerous practical demonstrations of the importance of weeding, so that next year there may be noticeable improvement in the care given the fields, with a corresponding increase in the crop.

The importations of rice during the year just ended were far less than for any previous year since American occupation. Scanty rainfall has seriously imperiled this year's crop in many of the provinces, but if rain comes before irreparable damage has been done it is believed that its crop will be nearly sufficient to meet the needs of the islands.

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Full details as to the experimental plantings of rice which have been made and the results in each case will be found in the accompanying report of the director of agriculture.

The best yield was obtained on land which had been fertilized with 600 pounds of tobacco waste to the acre, from the Manila factories, and was at the rate of 2,900 pounds of unhulled rice to the acre. This experiment showed that a large amount of valuable fertilizer is going to waste at the Manila tobacco factories.

As a result of the practical demonstrations at Murcia, a considerable number of steam-plowing outfits have been purchased and put into operation. The results obtained seem to have been uniformly satisfactory. The cost of plowing land by steam has varied from ₱2 to ₱6 per acre, the difference depending chiefly upon the ease or difficulty with which fuel and water were secured.

The great weight of steam-plowing outfits is the chief obstacle to their introduction. Two machines for use in eastern Negros lay in Manila many months before they could be shipped, and the landing of heavy machinery at ports where there are no piers and no large lighters is necessarily a matter of great difficulty.

In its efforts to secure a lighter plowing outfit, the bureau of agriculture has experimented with a kerosene-explosion engine weighing only 2,800 pounds. This engine develops plenty of power, but thus far has proved unreliable in its action. The agents maintain that the difficulty is due to defects in the sparking device and can readily be remedied. Should this engine prove successful it would fill a great need, as its lower cost would put it within the reach of many persons who could not afford to purchase a large steam-plowing outfit, and its small weight would facilitate its passage over bad roads and weak bridges.

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PHILIPPINE IMPORTS OF RICE—FROM OFFICIAL RECORDS, BUREAU OF INSULAR AFFAIRS.

Calendar year.	China.		British East Indies.		French East Indies.		Siam.		Other countries.		Total.	
	Pounds.		*Pounds.*		*Pounds.*		*Pounds.*		*Pounds.*		*Pounds.*	
1885	36,574	$1,238	52,730,117	$709,781	35,882,206	$457,070	4,856,714	$71,430	59,024	$2,578	93,564,635	$1,242,097
1886	3,192,054	31,164	85,041,546	1,416,189	50,183,080	584,130	----------	--------	918,174	12,133	139,334,854	2,043,616
1887	479,478	5,455	100,754,235	1,004,678	65,734,084	702,980	2,590,140	35,750	6,783,598	64,819	176,341,485	1,813,682
1888	33,983,900	620,916	25,667,471	203,180	111,014,626	1,030,552	7,440,252	99,107	3,652,970	41,347	181,759,219	1,995,102
1889	45,776,092	1,790,190	18,588,061	147,423	120,661,958	1,878,238	2,961,091	40,940	323,465	6,029	188,310,667	3,862,820
Average, annual	16,693,620	489,793	56,556,286	696,250	76,695,181	930,594	3,569,639	49,445	2,347,446	25,381	155,862,172	2,191,463
1890	20,118,924	268,963	15,809,323	147,429	120,053,036	1,145,608	----------	--------	912,255	10,284	156,894,138	1,572,279
1891	28,085,356	282,999	8,034,678	76,096	141,265,592	1,420,421	----------	--------	4,856,229	44,078	182,241,855	1,823,594
1892	25,277,950	196,355	11,719,876	91,037	101,137,608	785,622	----------	--------	113,129	879	138,248,563	1,073,893
1893	15,074,391	104,786	4,293,602	29,847	70,896,098	492,824	----------	--------	125,618	874	90,389,709	628,331
1894	13,818,543	80,551	9,165,192	51,864	74,739,485	424,664	----------	--------	1,198,692	6,800	98,921,912	563,879
Average, annual	20,475,033	186,731	9,804,534	79,255	101,618,484	853,826	----------	--------	1,441,184	12,583	133,339,235	1,132,395
1900	201,121,848	2,478,890	8,292,064	132,181	44,070,934	741,498	1,894,442	31,811	66,134,825	980,676	321,514,113	4,365,052
1901	107,987,106	1,448,231	52,685,988	702,969	173,767,827	2,283,704	40,561,035	653,990	1,200,438	19,447	376,211,389	5,108,344
1902	177,090,981	2,439,011	17,541,887	250,062	412,894,601	5,572,027	26,625,302	436,360	5,307,306	86,928	639,460,077	8,784,386
1903	101,884,851	1,663,848	90,940,942	1,547,634	474,068,080	8,152,068	58,281,754	989,090	11,907,597	199,742	737,083,174	12,552,381
1904	----------	----------	66,510,582	874,405	489,039,371	6,371,981	29,832,405	455,609	498,209	8,759	585,880,567	7,710,758
Average, annual	117,616,957	1,605,996	47,194,292	701,450	318,768,158	4,624,256	31,438,988	513,372	17,011,474	259,110	532,029,864	7,704,184
10 months ending October, 1905	1,233	32	33,053,154	467,610	341,012,533	4,710,851	62,421,678	892,619	2,716,056	40,580	439,204,648	6,111,642

NOTE.—Hongkong included under British East Indies from 1885 to 1887; from 1888 to 1894 under China, and from 1900 to 1904 under other countries.

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DUTY ON RICE.

March 3, 1905.		March 3, 1905.		In terms of 100 kilos.
PHILIPPINE TARIFF.		UNITED STATES TARIFF.		
Rice—Until May 1, 1905:		Rice cleaned.....per pound..	$0.02	$4.40
(a) Unhusked, G. W., 100 kilos.....	$0.40	Uncleaned rice, or rice free of the outer hull and still having the inner cuticle on....per pound.	.0125	2.75
(b) Husked, G. W., 100 kilos.....	.50	Rice flour and rice meal, and rice broken which will pass through a sieve known commercially as No. 12 wire sieve, per pound..	.0025	.55
(c) Flour, G. W., 100 kilos.....	1.50	Paddy, or rice having the outer hull on .....per pound..	.0075	.65
On May 1, 1905, and until Jan. 1, 1907:				
(a) Unhusked, G. W., 100 kilos.....	.60			
(b) Husked, G. W. 100 kilos.....	.75			
(c) Flour, G. W., 100 kilos.....	1.75			
On and after Jan. 1, 1907:				
(a) Unhusked, G. W., 100 kilos.....	.80			
(b) Husked, G. W., 100 kilos.....	1.00			
(c) Flour, G. W., 100 kilos.....	2.00			
Provided, however, That the Philippine Commission may, in its discretion, continue in force the rate of duty first above stated until, in its opinion, the conditions in the Philippine Islands may warrant the higher rates therein provided.				

NOTE.—Philippine rice production in census year (1902) is stated at Volume IV, page 328, to have been 8,599,233 hectoliters of paddy, or unhulled rice (2.8375 bushels to the hectoliter), or 2,440,032 bushels (bulk measure). On page 91, ratio of unhulled to hulled is 2 to 1, and reduced in weight on basis of 60 pounds to the bushel, gives production in round numbers of 732,000,000 pounds.

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KAPOK (Tree Cotton).

[From Report of the Philippine Commission, 1904, vol. 2, p. 536.]

The cotton tree is found in nearly every province of the Philippine Islands. Its fiber is used locally for stuffing pillows and mattresses and is shipped in small quantities to Manila, principally from Oriental Negros. The good qualities of kapok are such, it being one of the most valuable of the so-called "stuffing and filling" fibers, as to warrant its more general cultivation. The tree is easily grown and the yield of fiber is large.

In January of the present year a press bulletin on this subject was issued entitled "The White Cotton Tree." In this bulletin attention was invited to the importance of the kapok industry in the island of Java and the desirability of its further development in the Philippines. The production of kapok in Java has increased from 300,000 kilos (700,000 pounds) in 1882 to over 4,000,000 kilos (9,000,000 pounds) in 1901. During the first six months of 1902, which was a period of industrial depression in Java, 20,398 bales of kapok were exported, of which the United States received about $50,000 worth.

During the month of January an order was placed by the bureau for an improved kapok-cleaning machine. A superior variety of the cotton tree having been reported from Colombia, South America, the United States consul at Quibdo has been requested to furnish this bureau with seed of this variety. With favorable soil and climatic conditions, and with the present distribution of the cotton tree, it is believed that, by the introducion of fiber-cleaning machines and with the further distribution of seed, this fiber may be produced in sufficient quantities for export.

[From Report of the Philippine Commission, 1905, vol. 2, p. 42.]

The chief of the bureau, knowing that kapok, or tree cotton, was produced in considerable quantity in the islands, has investigated its use and its price in the United States market. He finds that a pound of kapok makes as large and as good a pillow as do 2 pounds of feathers, and even at American prices costs but one-eighth as much. Also that kapok will buoy up thirty-five times its own weight in water and does not become wetted after long submersion. A French society, in making experiments with it as life-saving material, proved that after soaking eighteen hours a small mattress would still support several men. The fiber is extraordinarily elastic and seems to retain its elasticity indefinitely. It is very valuable for use in fine upholstering, and should be one of the best of substances for preparing comforts for covering in cold climates. Probably 1,000,000 pounds of it go to waste annually in the Philippine Islands. It may be had here in abundance at about 5 centavos per pound in the seed, the seed making up about 63 per cent of the total weight. A McCarthy cotton gin readily cleans it from the seed. The New York price is 12 to 13 cents gold.

The seed has been analyzed at the bureau of government laboratories, and was found to be 38 per cent richer in oil than is ordinary cotton seed. It has a fertilizing value of about $17 gold per ton, and has been fed with advantage to different kinds of stock by the bureau of agriculture.

The kapok tree is possessed of extraordinary vitality. The trunk, if cut down during the rainy season, trimmed of all branches, and set in the ground, will send out roots and grow, while single branches stuck into the ground at this season promptly take root and soon grow into trees. The trees require absolutely no care, and the pods containing the cotton fall to the ground when ripe.

There are vast areas in these islands perfectly suited to the growth of this valuable fiber-producing tree, and an important kapok industry should be developed in the near future.

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[From Report of the Philippine Commission, 1905, vol. 2, p. 431.]

This product has received much attention. It is no doubt the world's finest stuffing material, and a recent cablegram quotes its price in New York at 12¾ cents gold per pound. It has been determined that large quantities can be had in the islands at about 5 cents Philippine currency in the seed, the seed making up about 63 per cent of the weight. We found that a McCarthy gin for ordinary cotton cleans it perfectly of the seed. The price in New York should enable those buying, cleaning, and shipping it to make a good profit. We submitted the seeds to the bureau of government laboratories for analysis, and they were found to be 38 per cent richer in oil than the ordinary cotton seed. They should have a fertilizing value of about $17 gold per ton. We have been feeding them to advantage to different kinds of stock.

Wishing to learn still further about this fiber, we have made tests that prove that one pound of the cleaned kapok makes as large and as good a pillow as two pounds of feathers. Counting kapok at 12¾ cents a pound and feathers at 50 cents a pound, the former is eight times as cheap a stuffing material as the latter. It seems never to lose its elasticity and never packs or mats as real cotton does. It does not become wet if immersed in water ever so long. It is claimed to be the best material for life preservers known, being much superior to cork.

It will buoy up and keep above water 35 times its own weight, and 10½ ounces of the material have been found to support a man weighing 145 pounds in the water. A French society in making some experiments with it as life-saving material is said to have found that after soaking for 18 hours a small mattress made thereof supported several men.

According to our experiments it seems that a kapok pillow equal to a 2-pound feather pillow can be made complete for less than 25 cents gold. A feather pillow will probably not sell in competition with pillows made of kapok after the latter's merits shall have become well known. The slow changes taking place in the animal matter of feather create disagreeable odors. On account of cheaper covering material the kapok can be shipped to the United States and there a pillow could be turned out for about 25 cents that would be superior to a feather pillow which would cost not less than $1.25. It would seem also that thick comforts for covering in cold climates could be made to great advantage out of this material, inasmuch as a comfort, say, 3 inches thick and making practically a dead air space of this thickness, would not weigh as much as a double blanket. As a mattress material 10 pounds would equal 20 pounds of feathers, and, I believe, 40 pounds of felt. It would therefore seem that there is a remarkable opportunity in the United States for pushing this Philippine product, and as a result of our investigations a large amount of kapok is in preparation to be sent there for sale, the markets having been tested by cable. It is almost certain that a reliable supply and a reasonable amount of advertising would create a demand for more than the whole world now uses. In this connection a letter was sent to a dozen or more upholstery firms in the United States, as follows:

"BUREAU OF AGRICULTURE,
"*Manila, P. I., July 10, 1905.*

"GENTLEMEN: Are you acquainted with the kapok, or tree cotton, for pillows, cushions, mattresses, etc., and, if so, do you use it? I believe that a pound of cleaned kapok will make as good a pillow as two pounds of the best feathers, and would always be free from the decomposition and the more or less unhealthful odors that must arise from feathers, hair, wool, etc.

"Seeing the excellent qualities of this material for various purposes of the kind mentioned, I have been surprised that firms such as yours have not made up this material and advertised it extensively on its merits. There must be one or more million pounds of cleaned cotton going to waste in these islands each year. This bureau is now making an effort to put it in touch with the people who buy it, or should buy it. We have at the present time some 60,000 pounds of it collected. We are sending you a small sample, and would like to hear from you as to its market value, its qualities, etc.

"Very respectfully,

"W. C. WELBORN, *Chief of Bureau.*"

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[From Report of the Philippine Commission, 1906, vol. 2, p. 172.]

Some commercial shipments of kapok, or stuffing cotton, have gone to the United States since we discussed its value last year. A machine was received from England for cleaning it of seed, but the machine was a failure. A slow-working English cotton gin does work it, but not rapidly enough to meet the conditions of large development. The American saw gin failed to work it. Lately a commercial firm has received an American machine designed and built especially to clean it, but this machine has not yet been set up. To clean this material would seem to present no great difficulties, and a machine would not need to be very strong, heavy, or expensive.

The kapok, from numerous inquiries I made in the United States, appears to have a steady value of 9 to 13 cents United States currency a pound. It sells in some of the provinces as low as ₱3 a picul (137½ pounds) in the seed. It turns out about 35 per cent lint and 65 per cent seed. The seed have an oil content and the cake a fertilizing and feeding value that ought to give the seed a value of ₱50 to ₱60 a ton. Even at a higher purchase price for the raw cotton, fine profits should be made by buying and cleaning this material with suitable machines.

The real cotton has generally not been successful with us. A species of boll weevil generally prevents any yield of account. There may be localities where this insect is not found, but at present we do not feel like encouraging cotton growing in more than an experimental way.

A new and unidentified species of agave, said to be quite superior to Yucatan sisal, has been introduced from Tuxpan, Mexico.

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INDIGO AND OTHER DYE PLANTS.

[From Report of the Schurman Philippine Commission, 1900, vol. 4, p. 52.]

INDIGO INDUSTRY.

The production of indigo was formerly of much more importance than now. The method of making it in this archipelago will now be spoken of. This includes several operations, maceration in water, the addition of lime, shaking or stirring and decantation of the water, formation of the indigo into masses, and wrapping. After the plant is cut and made up into bundles it is taken to the factory. This is composed of various parts. In the first there are two or more cylindrical or conical receptacles made of masonry or wood, each being 2½ meters in height and 2 in diameter. These are called machos. In the second, called hembra, there is a receptacle double the capacity of those already mentioned which is cylindrical in shape, wider than it is high, the sides somewhat inclined, and having two faucets at different heights on the side, through which the impregnated liquor can flow; in the third a receptacle, made of masonry, which is in circular form, a meter and a half high and a meter in diameter, into which the indigo paste coming from the hembra is placed, in order to separate the water from it, and lastly the secadero, where the indigo is exposed to the air and afterwards dried.

Maceration is the first process. The receptacles called machos are filled four-fifths full of water and the bundles of indigo immediately thrown in them. A grating of bamboo having weights attached is now lowered 4 or 5 inches below the surface of the water, the plant being allowed to macerate for twenty-two hours, during which time the leaves undergo a sort of fermentation, liberating the indigo which is held in solution in the water. During this operation the water first becomes yellowish in color, then yellowish-green, and finally green with a yellowish tinge. The maceration being complete, lime is added. In this operation the grating is first removed and the plants taken out after being allowed to drain on the sides of the receptacle. Baskets of quicklime are then lowered into the water, when the liquid immediately changes from green to greenish-blue. It is then drawn off immediately by means of the faucets, beginning with the upper one, and passed on to the hembra or second receptacle by means of little troughs. In the hembra the liquid is stirred with sticks, thus exposing it to the air so that the indigo becomes insoluble. This operation lasts from half an hour to an hour. At the end of the operation the water is bluish-brown in color. It is allowed to remain until more water is added from the first receptacle, when the same operation is repeated. The indigo deposited is now allowed to remain fifteen or twenty days, when it is transferred to the third receptacle. Here it remains for two or three days, becoming separated from the greater part of the water which it contains, this being drawn off by the faucets.

In this place the various grades of indigo become distinguishable, the upper layers containing the superior grade, the central layers the medium grade, and the lower layers the inferior grade. The indigo is now placed in bamboo boxes, having a layer of cotton in the bottom so that the water may drain through. At the end of two days the mass is kneaded by hand into cakes or balls, which are placed on mats arranged on benches in the drying room. Here the drying process continues for five or six days, the indigo being placed in the sun as often as possible, so as to advance the process more rapidly. The mass is now cut with bamboo knives into the proper size, which is usually about 6 inches in length by half as much in depth and height, the corners of the cake being rounded off with the hand. After the cakes are dried they are placed in wooden boxes, where they are kept ready for the market.

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[From Census of Philippine Islands, 1903, vol. 4, p. 97.]

INDIGO.

The production of indigo and *tintarron* (liquid indigo), though of minor importance as compared with other products of which mention has been made, has been a source of considerable income and has contributed appreciable amounts to the sum total of insular exports, as indicated by the following table, which shows the quantities and values of the two products for each calendar year since 1854 for which statistics are available, with the percentage that such values were of the total value of exports annually.

Quantities and values of indigo and tintarron (liquid indigo) exported from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Indigo.			Tintarron.			Total value (dollars).	Per cent of total value of exports.
	Quantity (kilos).	Value.		Quantity (kilos).	Value.			
		Pesos.	Dollars.		Pesos.	Dollars.		
1854	194,727	82,349	87,224	[a] 8,471	25,818	27,346	114,570	1.70
1855	321,814	199,434	209,565	[a] 2,027	5,001	5,255	214,820	3.34
1856	269,083	134,744	141,589	[a] 10,610	31,830	33,447	175,036	1.82
1857	302,908	241,540	256,781	[a] 2,130	7,070	7,516	264,297	2.09
1858	17,853	12,338	12,965	[a] 6,945	25,008	26,278	39,243	.40
1860	121,842	82,417	87,576	[a] 8,707	32,575	34,614	122,190	1.21
1861	184,834	110,545	116,017	[a] 10,556	36,946	38,775	154,792	1.83
1862	134,864	88,036	93,107	([b])	62,287	65,875	158,982	1.65
1863	72,608	49,502	52,314	847,097	89,253	94,323	146,637	1.38
1864	114,848	117,074	123,724	157,686	14,810	15,651	139,375	1.24
1865	163,384	154,587	162,533	557,726	112,435	118,214	280,747	1.28
1866	251,574	460,760	484,766	659,206	133,922	140,899	625,665	2.68
1867	24,677	47,458	49,522	513,511	91,982	95,983	145,505	.63
1873	12,987	7,792	7,946	629,485	125,897	128,377	136,323	.57
1874	54,955	44,708	44,923	201,471	26,439	26,566	71,489	.41
1875	117,098	85,294	83,264	528,058	24,550	23,966	107,230	.58
1876	139,579	107,112	97,975	572,946	25,285	23,128	121,103	.89
1877	198,552	148,520	140,262	56,814	3,466	3,273	143,535	.98
1878	70,764	37,635	34,112	213,300	16,758	15,189	49,301	.31
1879	192,121	192,192	169,725	221,611	15,516	13,702	183,427	1.10
1880	139,151	137,147	123,405	429,553	41,919	37,719	161,124	.76
1881	159,631	138,958	123,631	83,226	8,256	7,345	130,976	.60
1882	83,485	62,674	55,924	521,136	51,696	46,128	102,052	.55
1883	33,087	23,322	20,341	378,370	25,042	21,842	42,183	.18
1884	51,100	34,287	29,984	395,306	25,416	22,226	52,210	.26
1885	67,338	42,129	35,169	332,231	24,540	20,486	55,655	.27
1886	50,044	35,425	27,688	327,467	19,890	15,546	43,234	.22
1887	106,757	68,879	53,009	668,984	43,336	33,351	86,360	.44
1888	183,487	123,469	94,862	419,738	22,820	16,850	111,712	.57
1889	121,516	108,374	79,633	363,575	15,321	11,258	90,891	.35
1890	66,653	16,416	13,497	507,276	17,280	14,208	27,705	.13
1891	95,561	59,184	45,945	391,358	21,430	16,636	62,581	.30
1892	317,015	204,975	140,367	408,836	19,192	13,143	153,510	.80
1893	107,133	85,072	52,158	276,424	13,575	8,323	60,481	.27
1894	25,072	33,976	16,947	191,794	17,000	8,480	25,427	.15
1898	([c])			([c])				
1899	116,370		32,694	([c])			[d] 32,694	.22
1900	5,545		1,325	([c])			[d] 1,325	.01
1901	7,884		3,178	([c])			[d] 3,178	.01
1902	251,025		16,573	([c])			[d] 16,573	.06

[a] Tinajas.
[b] Quantity not specified.
[c] Not separately reported.
[d] Not including tintarron.

The provinces of Ilocos Norte and Ilocos Sur produce more indigo than all other provinces combined. The dye is produced, however, to some extent in the provinces of Bataan, Batangas, Bulacan, La Laguna, Pampanga, Pangasinan, and Zambales. It will be observed that in the years 1900, 1901, and 1902 the values of annual shipments fell considerably below those of the preceding years, for which figures are presented in the above table. This falling off is said to be due largely to the use of aniline dyes and to adulterations made by Chinese speculators in the dye, which has discredited the Philippine product and caused a depreciation in its price.

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CULTIVATION OF THE INDIGO PLANT.

[By Amelio A. y Lallave, Ilocos Sur.]

The indigo plant had its origin in India, and is to be found in nearly all the provinces of the Philippine Islands, especially in Ilocos Sur, and though still cultivated in the islands it is only upon a very reduced scale.

This plant requires fertile soil; if virgin, so much the better. At the close of the rainy season—that is, in October—preparation of the ground should be begun. Deep tillage should be given it with the plow, and the operation repeated at the end of the month. At the beginning of November a third plowing is effected and the ground harrowed, so as to leave the soil well crumbled. Sowing is then proceeded with. Furrows are made, as nearly straight as possible, and about a foot apart. The planter carries the seeds in a small sack under his left arm, and with his right hand scatters them copiously into the furrows, which he then covers with earth, using both feet. This operation is easily performed by our planters.

A few days after planting the seeds begin to germinate, and when the plants have attained a height of one palm or less the ground is once more plowed between the furrows, if soil conditions require it, for the purpose of cleaning it of all weeds and at the same time heaping the earth about the plants. Thenceforward the plants develop rapidly, and in two and a half months are usually in condition for cutting, which is done when they are about to bloom. Harvesting is then effected.

When the plants are cut they should be immediately conveyed to the place where the operation of extracting the dyestuff is to be performed. Haste is recommended, because the least delay may cause fermentation in the leaves, thus causing injury to the product. The extraction of the coloring matter is effected in the following manner:

The necessary apparatus for this manufacture should be placed near the plants and where water can be had. If this be not possible, a well should be dug, so as to supply the necessary water, the amount required depending upon the quantity of leaves to be treated.

The receptacles in which the leaves are to be deposited are called machos and are made of masonry. There may be one, two, or more of them, according to the number of leaves to be treated daily. They should be cylindrical and provided with three or four spigots, which are usually made of cane, through which the liquid is drawn off. Underneath and at right angles to the spigots is constructed a small leakage tank, which catches the drip as the fluid is drawn through the spigots. If four tanks are required instead of one, they should be constructed in a semicircular form, so that they may converge. Hembra is the name given to a larger tank, also constructed of masonry and close to those previously constructed, to receive the liquid drawn from them. This hembra must necessarily be lower than the machos. For this purpose a hole is dug in the earth, of the necessary dimensions, and the hembra solidly constructed in order to avoid the loss from leakage. Close to the hembra another small tank is constructed, and another, smaller still, at the side of this, is necessary for completing the operation of extracting the dyestuff. All of these apparatus may vary, according to the quantity of leaves to be treated, the condition of the soil in which they are constructed, and the pleasure of the individual planter; but whatever disposition may be made, the object to be attained is always the same. When the apparatus is ready, the manufacture of the indigo is begun.

Early in the morning the plants should be cut, in sufficient quantity to fill the macho or machos, and immediately conveyed thither and deposited in them. The receptacle is at once filled with water, completely covering the leaves, so that none will float on top. A sort of grating of cane is placed over the mass, and on top of this grating a weight of some kind—a rock will answer the purpose.

The infusion is allowed to stand until the following morning. In the first hour all of the leaves are removed from the machos, and the liquid tempered with a certain amount of lime of good quality, which is placed in a basket, the basket being shaken from right to left, or vice versa, until the lime has been spread over the entire surface. If a piece of stone should remain in the basket unburned, it is thrown away, and the operation just described is repeated with all of the machos. In a short time the lime will have been precipitated to the

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bottom, carrying with it any stray leaf that may have remained, as well as whatever dirt there may be. The liquid is then withdrawn instantly from the machos into the hembra by means of a hollow cane. By opening the uppermost spigot the operator is able to see whether the liquid is clear and transparent, in which case the cane is attached to conduct the liquid into the hembra. Having drawn all the fluid through the first spigot, the second one is turned on, then the third, and so on until the last, and the same operation is effected with the other machos. While this work is being performed in the manufactory, other laborers will have cut a fresh supply of leaves, in the same quantity as those just used, which will be handled the same as those of the previous day. At the expiration of the second day the workmen commence to stir the liquid contained in the hembra. Three or four men, each provided with a spatula made of slender cane, to one end of which a small wooden tablet is attached, about one palm in length and three fingers in width, station themselves on the wall of the hembra and stir the liquid for at least an hour, when it is allowed to settle until the following day, care being taken to cover the receptacle with cloth or anything that will prevent the entrance of dirt or foreign matter into the liquid. On the following day, when the liquid in the hembra has settled, the first or top spigot of the hembra is opened in order to permit the outflow of a portion which has not yet assumed any color. This done, the machos are again emptied into the hembra as far as possible and the stirring is resumed. These operations are performed daily for eight or ten days, when they are suspended in order to extract the dye.

After a day, or preferably two days, of settling, all of the dyestuff contained in the liquid will have been precipitated to the bottom. The first spigot is then opened, then the others, successively, until the last, which is located the width of a few fingers from the bottom one, has been opened. Then the man in charge, or an intelligent laborer, descends to the bottom, and, while disturbing the liquid as little as possible, he collects it in a vessel, which he hands to another laborer standing above, who in turn hands it to another, this latter emptying the vessel into the next smaller tank referred to, and this work is continued until all the liquid has been collected.

On the following day new cuttings may be made, and all of the operations just described repeated, until the entire crop has been treated.

In from four to six days the dye in the smaller tank will have formed a sediment at the bottom, when all the water will be drawn off as was done with the hembra, and the dye will then be removed to the smallest tank. At the bottom of this tank is placed a frame made of cane, raised from four to six fingers above the floor of the tank; over this is stretched a clean cloth, upon which is thrown the dye. The water filtering through this cloth leaves the tank through a small hole in the bottom and is deposited in a small well close by. Since the water will at first carry with it some of the dyestuff, the operation of filtration should be repeated until the water flows thoroughly clean and transparent. By the following day all the water will have drained off, and the sediment remaining is made up into tablets or balls, fashioned by hand into the desired shape and size. These tablets or balls are then placed upon clean cloths, stretched upon a cane frame, and exposed to the sun, where they are allowed to remain until thoroughly dry.

When all the plants have been cut, the tanks should be covered and the utensils carefully put away to be used in the second cutting, which, if there has been some rain, will be as plentiful as the first, provided always that the rainfall has been slight and that it occurred before the plant brought forth many stalks; for when in this condition the rain may cause the production of a large amount of dyestuff. If the year be a good one, or if the rainy season is backward, a third cutting may be possible.

The cultivation of indigo was the source of considerable wealth in the Philippines, especially in Ilocos Sur, until 1883–84, when the producers began to adulterate it with sand and other substances so that its value in the market fell from 90 to 120 pesos per quintal to from 29 to 40 pesos per quintal, which brought about the ruin of this industry, the producers abandoning it and the market seeking its supply in other countries.[a]

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[a] The decline of this industry in the Philippines is no doubt due in some measure to the manufacture of artificial indigo, which is produced from coal tar products, and which is always chemically pure, whereas the amount of available dyestuff of natural indigo varies from 20 to 90 per cent of the commercial products, due either to accident or adulteration in the preparation.—*Director.*

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To-day an insignificant quantity is cultivated without any attempt to increase its cultivation, which would undoubtedly be done if the former price were paid. In Vigan to-day from 40 to 90 pesos per quintal are paid, according to the quality, and the greater part goes to the Chinese in Manila, and is used by them to dye their cloths.

The importance of this article should not be judged by the price paid for it to-day, but by that which it would command under good cultivation and proper care, which, as I have said, has reached 90 to 120 pesos per quintal.

The expenses of cultivation per hectare are as follows:

	Mexican.
First plowing	$12.00
Second plowing	9.00
Third plowing	5.00
Sowing the grain	2.90
One plowing to kill the weeds	4.00
Weeding and cleaning	4.00
Total	36.90

The expenses of labor, first cutting, are as follows:

	Mexican.
Four plant cutters for ten days, at 30 cents each per day	$12.00
Transportation to factory (according to distance): Four *cargadores* (carriers), who may be the same men used to do the cutting.	
Six cavans of lime	3.00
One master workman in the business	8.00
Water: Cost according to the distance from which it is brought, but generally it is brought by the cutters.	
Total	23.00

The figures may vary quite materially, according to the localities, prices of labor, distances from the land cultivated to the factory, water facilities, etc.

The product of 1 hectare, supposing that there is a high grade of cultivation, good judgment in the choice of land, sufficient moisture at the beginning of the plowing, and good atmospheric conditions, should easily reach 4 quintals of dye of good quality.

DYEWOODS.

The forests of the Philippines abound in a great variety of dye plants and woods, which are largely used by the people in coloring the fabrics they weave from native and imported fibers. In addition to their domestic use, the exportation of dyewoods has been, in the past, a considerable branch of commerce, and their shipment is still carried on to some extent. In 1875 the value of dyewoods exported amounted to $332,976, a sum which had never been previously reached and which has not been nearly equaled since, except in 1878, when their value was $313,604. In 1895 the value of such shipments had fallen to $13,828.

Since American occupation the only dyewood of which a record is given in official commercial reports is sapan wood, beginning with the last six months of 1900.

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The statistics covering the exportation of dyewoods, as far as available, are presented in the following table:

Quantities and values of dyewoods exported from the Philippine Islands during each calendar year specified: 1854 to 1902.

Year.	Quantity (kilos).	Value.		Per cent of total value of exports.
		Pesos.	Dollars.	
1854	1,629,579	36,566	38,731	0.58
1855	1,597,804	43,158	45,350	.71
1856	3,353,048	86,893	91,307	.95
1857	3,233,450	100,841	107,204	.85
1858	3,217,750	88,644	93,147	.94
1860	2,281,736	59,187	62,892	.62
1861	2,037,850	48,254	50,643	.60
1862	1,476,323	29,146	30,825	.32
1863	337,919	4,631	4,894	.05
1864	1,416,369	53,869	56,929	.51
1865	2,308,937	176,430	185,498	.84
1866	2,858,895	139,142	146,391	.63
1867	3,483,863	152,378	159,006	.69
1873	[a] 11,915,874	164,548	167,790	.70
1874	10,794,572	255,907	257,135	1.48
1875	11,405,574	341,094	332,976	1.80
1876	5,959,163	138,649	126,822	.93
1877	5,064,200	106,100	100,201	.65
1878	9,340,039	345,989	313,604	1.98
1879	8,114,094	167,620	148,025	.89
1880	6,018,374	176,250	158,590	.75
1881	4,453,950	58,231	51,808	.24
1882	4,790,480	116,408	103,871	.56
1883	3,342,600	69,995	61,050	.27
1884	2,792,086	51,383	44,934	.23
1885	4,359,950	73,539	61,390	.30
1886	5,039,198	86,599	67,686	.34
1887	2,898,220	32,680	25,151	.13
1888	7,002,613	119,380	88,150	.45
1889	4,294,387	80,533	59,176	.23
1890	2,765,445	43,715	35,942	.17
1891	3,206,914	142,112	110,322	.53
1892	4,226,109	64,052	43,863	.23
1893	4,942,575	94,998	58,243	.26
1894	3,861,992	69,851	34,842	.21
1895	1,620,981	26,907	13,828	.07
1898	([b])	([b])	----------	----------
1899	([b])	([b])	----------	----------
1900 [c]	([d])	----------	[e] 11,076	.05
1901	([d])	----------	[e] 38,850	.16
1902	([d])	----------	[e] 20,468	.07

[a] Pieces.
[b] Not reported separately.
[c] Six months ending December, 1900.
[d] Quantity not reported.
[e] Sapan wood.

[From Report of the Schurman Philippine Commission, 1900, vol. 3, p. 257.]

CHAPTER V.

PLANTS PRODUCING DYES.

* * * * * * *

DIVISION A.—DYE PLANTS.

Under this heading are included those plants which furnish to industry substances from which dyestuffs can be made. The cultivation of these plants has diminished greatly since the discovery of the aniline dyes which are to-day so much used.

INDIGO (AÑIL) (INDIGOFERA TINCTORIA L.).

This plant, belonging to the family Leguminosæ, is a native of India, where it is found wild in many places and in others under cultivation. The juice extracted from its leaves and young stalks furnishes a blue dyestuff known as indigo, which is much used in the industries. The principal Philippine

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provinces in which it is produced are Bataan, Batangas, Bulacan, Laguna, Pangasinan, Pampanga, Zambales, and North and South Ilocos. The latter province, even with a small crop, produces more than all the other provinces combined.

Besides the species already mentioned others are found in the Philippines, as *Indigofera trifoliata*, L.; *Indigofera trita*, L.; *Indigofera hirsuta*, L., the first two being cultivated.

Cultivation.—The indigo plant, called by the Tagalogs tayum, has small, slender, round leaves, whose tips are colored. It produces little slender pods full of seeds, by means of which it is propagated in the fields. Although this plant grows in temperate climates, two or three crops a year may be obtained in warm, moist climates as against one in the former. The most suitable grounds for the cultivation of this are those having light, deep soil, as the roots of this plant ramify but little, the central long root penetrating deeply into the soil. For this reason lands lying along rivers and small streams and at the foot of mountain ranges are most suitable for its cultivation, especially if they abound in alluvium. The land should be free from trees, so that the sun's rays are not cut off.

Under these conditions the juice of the leaves and young stems is more abundant. The soil should be deeply worked and fertilized by such substances as the residue of the indigo plant and others which contain organic matter, alkaline salts, phosphates and lime, such as refuse, ashes, etc. The seed is sown broadcast or in lines, the latter method being preferable, as it saves seed and facilitates weeding and irrigation. When the young plants are one month old the ground should be cleared of weeds, which deprive the plants of sustenance and of light and ventilation, all of which are so necessary to them. As the coloring matter is extracted principally from the leaves, these should be collected as soon as they are completely formed and before the fruit has formed. The indigo in the leaves is without color and in solution, and forms a part of the juice. When the juice is extracted from the plant it is yellowish white in color. On being exposed to the action of the air it changes successively to yellowish green, green, greenish blue, and finally, becoming insoluble, it falls as a blue precipitate, in the bottom of the vessels in which it is contained, about thirty hours after the extraction of the juice.

Uses.—Indigo is used for dyeing thread and cloth of cotton, silk, and wool and for coloring wood paper, etc. In commerce several varieties of indigo are known, of various values. Philippine indigo is of about the same grade as that of Coromandel and Madras, which is next to that from Bengal, the most highly prized, but on account of adulterations made by speculators, principally Chinese, who mix other materials with it, Philippine indigo is somewhat discredited and has suffered depreciation in price in the markets of the world. Nevertheless, this article is regularly exported to China, Japan, and Singapore.

RATTAN (SIBUCAO) (CÆSALPINIA SAPPAN L.).

This is a plant of the family Leguminosæ, whose woody trunk produces a red coloring matter similar to campeachy or logwood, and which is employed in dyeing cotton or wool. It is very abundant in the forests of the Philippines, and some excellent varieties are found, which produce a color more highly valued than that of the Brazil woods. It grows naturally from the seeds which fall from the pod on the ground. Considerable amount of the dye is produced in the Philippine Archipelago, and it is an important article of export to China and England. The Chinese employ it in dyeing silks, damasks, and other fabrics woven in China. It is sometimes used in place of cochineal, though the color is not as stable.

SAFFLOWER OR ALAZOR (CARTHAMNUS TINCTORIUS L.).

This is a plant of the family Compositæ, called also bastard saffron and in the Philippines biri. It is valued and cultivated for its stamens, which contain three principal coloring matters, two yellow, soluble in water and of little value, and the third red, soluble in the alkalies and of greater importance. It is used in the adulteration of saffron.

AGUISIP (MELASTOMA POLANTHUM BLUM.), AND BANCURO (MORINDA TINCTORIA ROXB.).

These are two trees of the family of Melastomaceæ and Rubiaceæ, respectively. The natives extract from the bark of the former and the root of the latter a bright-red coloring matter which they use to dye pieces of hemp cloth,

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which are then called pinayusas. To obtain the coloring matter from the bancuro the bark from the upper part of the large roots is taken off, dried, and reduced to a fine powder. In this condition it is called nino or culit. The operation of dyeing these pinayusas is thus described by Father Delgado, S. J.:

"The operation of dyeing these white squares on the cloth is very complicated and delicate. They are placed in little piles upon one another in a curious and admirable manner. Each one of the little squares before being dyed is tied with a thread of hemp, each blanket or piece of cloth requiring innumerable little threads or puyos, as they are called in the native language; the little threads once tied up in this way, the dye is applied to the whole piece, a little lime is added, and after the cloth has taken the dye all the little threads are removed. As the dye has not penetrated the little squares which were tied up these remain white, and form on the red background figures which give to the cloth the name pinayusas. The natives use this for making tents, curtains, and for adorning their houses."

BACAUAN (RHIZOPHORA TINCTORIA L.).

Shrub or tree of the family Rhizophoraceæ. These trees make up the mangrove swamps which are commonly found along the coast and near the mouths of rivers. They have extensive and impenetrable jungles, the refuge of mosquitoes, aquatic birds, and marine animals. From the bark a reddish coloring matter is extracted. The wood is much used as firewood.

BALANTI (HOMALANTHUS POPULIFOLIUS B. GRAH.) AND CUMALON (DIOSPYROS CUNALON A. DC.).

These are two trees of the family of the Ebenaceæ, the bark of which when dried and reduced to a powder furnishes a black coloring matter used by the natives.

SALICSICAN (MORINDA UMBELLATA L.) AND OTHERS.

The salicsican is a species of nino or wild bancuro, from whose roots the natives extract a red coloring matter which they employ in various ways.

The natives extract dyes from various other species of wood. From the bark of the tree called bagolibas a dye is obtained which will give any kind of cloth a fine, tawny color. The prepared bark of the tree called dayagao makes a fine mordant, which imparts a fine luster and great stability to cloth dyed black, yellow, or red. Belolo, dugna, and hagur are very much used by fishermen for dyeing and strengthening their nets, which take on a dark brown color and are rendered less susceptible to rotting. Ananaples (*Albizzia procera* Benth.), of the family Leguminosæ, is used in dyeing hides which are to be used in the manufacture of whips, sole leather, and saddles.

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COMPILATION OF NOTES AND REPORTS ON THE LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

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LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

[From Report of the Philippine Commission, 1902, part 1.]

THE LABOR QUESTION.

The complaint of the American and foreign merchants in these islands that the labor to be had here is altogether inadequate has become acute, and the chambers of commerce representing the American, Spanish, English, German, and other foreign interests have sent a representative to the United States to invite an amendment to the present Congressional legislation which extends the Chinese-exclusion act applicable to the United States to these islands, on the ground that it is necessary to admit Chinese for the business development of this country. On the other hand, it is quite apparent from the declarations of the federal party and other political organizations in the Philippines and from the vigorous manifesto of the only labor organization in the islands that there will be much opposition on the part of the Filipino people to the further admission of the Chinese. That this opposition has been chiefly due to the competition which the Chinese have offered in the matter of stores and trading is obvious to anyone who has looked into the question; but it would be unwise to infer from that that the introduction of Chinese as laborers here would not be a very unpopular policy on the part of the government.

The Chinese laborer becomes a merchant within a year or two after he reaches these islands, and then begins a competition with the Filipino tradesman which in the end drives the Filipino out of business. Were there unlimited Chinese immigration to these islands I do not doubt that the tendency would be to relegate the Filipino to the position which the Malay occupies in the Straits Settlements. Most of the avenues of business would be commanded by the Chinamen, as they now are in Singapore and the Straits Settlements, and the islands would ultimately become rather a Chinese country than a Filipino country. It is doubtless true that were the doors opened and the Chinamen allowed to come in freely it would tend toward a much more rapid commercial and industrial development of these islands than we are now likely to have; but in this respect I think the merchants and others interested would be disappointed in the trend which affairs would take. It has not been possible in Borneo to introduce the Chinaman into the fields; he has declined to become a farmer or a farm laborer in that island, and as the conditions are very similar to those which prevail here we may expect the same result. There are to-day, although there may be 100,000 Chinamen in the islands, but very few engaged either in farming or in laboring upon farms. The attention of the Chinaman is given either to coolie labor or skilled labor in cities or to the tending of stores and to commercial business. It is quite possible that the admission of Chinamen would reduce the wages of the stevedores, of the domestic servants, and of coolies in the cities, but there is grave reason for doubting how efficient the Chinaman may be in the carrying on of farming operations.

During the year 1902 there has been a movement for the organization of labor in the city of Manila which doubtless will spread to the other parts of the islands. It has been regarded, because of abuses which crept in, as an unmixed evil. I can not think it to be so. If properly directed it may greatly assist what is absolutely necessary here—to wit, the organization of labor and the giving to the laboring class a sense of the dignity of labor and of their independence. The labor organizations in the city of Manila are very much opposed to the introduction of Chinese labor, and their declarations upon this point will find ready acquiescence in the minds of all Filipinos with but few exceptions. The truth is that from a political standpoint the unlimited introduction of the Chinese to these islands would be a great mistake. I believe the objection on

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the part of the Filipinos to such a course to be entirely logical and justified. The development of these islands by Chinamen would be at the expense of the Filipino people, and they may very well resent such a suggestion. The merchants and others who wish to invest here must take into consideration that labor is always likely for some time to be more expensive in these islands than it is in the United States per unit or product of labor.

Another phase of the labor question, which does not seem to have had its proper weight with the merchants of Manila in their demand for the admission of Chinese coolies, is the great obstacle which such a policy would present to the opening by the United States of its markets to Philippine products. The existence of cheap Chinese labor in these islands would furnish the strongest and most taking argument to those whose interests lead to their opposition to the reduction of the tariff, that the reduction would bring American labor and its products into direct competition with cheap Chinese labor and its products in these islands.

The evidence with respect to the efficiency and quantity of Filipino labor is quite conflicting. I append as exhibits (F 1 and F 2) to my report the reports of Major Aleshire and Captain Butt, in the quartermaster's department of the United States Army, who have had large numbers of Filipino laborers under their control and who have been quite successful in making them useful. I append also the report of the municipal board, and report of the city engineer of Manila, who has employed a great many Filipinos constantly, and whose evidence, generally, supports that of Major Aleshire and Captain Butt. I append also, marked "Exhibit F," the last report of the engineer upon the Benguet road, which shows very great discouragement in the use of Filipinos for the construction of public works in the country. I ought to add, on the other hand, that the manager of the Manila and Dagupan Railway Company has informed me that his road was constructed by Filipino laborers almost entirely, except that at one time they brought in quite a number of Chinese for the construction of bridges and the working upon the piers. The Chinese did not prove to be satisfactory, and Filipino laborers had to be substituted. On the other hand, the merchants of Manila claim that they find it very difficult to secure satisfactory labor or constant labor, and that the rates of wages are absolutely high. It is to be taken into consideration that these comparisons of wages and labor are made as to the efficiency with American labor, and as to reasonableness of price with the very low wages paid to Chinamen in Hongkong. Everything is high in Manila. The cost of living is very high, and it is not surprising that the cost of labor should have risen. The very great increase in the foreign commerce and coastwise trade in these islands, together with the needs of the Army and the insular government, has caused a corresponding increase in the demand for all kinds of labor in and about commerce, so that the increase in wages and failure of the local labor supply are easily understood.

I do not think it would be just to the Filipinos, or a proper course for America in the development of this country, to do more than to extend to the Commission the power to admit, upon reasonable restrictions, a certain limited number of skilled Chinese laborers, who may contribute to the construction of buildings and the making of other improvements, and who at the same time by their labor may communicate to Filipino apprentices the skill which the Filipinos so easily acquire. Such skilled laborers might be admitted under bond of their employers that they shall be returned to China at the end of three or five years, the bond containing a provision also that for every Chinaman imported and employed a Filipino apprentice should be employed. Further than this it seems to me that it would be unwise to go. But such a provision would probably bring about the establishment of shipyards here and other enterprises that now are impossible in the Philippines because the proper skilled labor is not to be had.

I am myself by no means convinced that Filipino labor may not be rendered quite useful. The conditions of war and of disturbance throughout the islands for six years have led the men to form loafing and gambling habits and have interfered with their regular life of industry. Where such restlessness prevails industry is apt to be absent. The Filipino laborers must be given three or four years before an intelligent and just verdict can be pronounced upon their capacity for effective labor. I am confident that it will be greatly better than the suffering merchants of Manila anticipate.

A just view of the future of labor in these islands can not be taken without considering the dependent condition of the Filipino laborers in Spanish times. Much of the labor was then forced, and there was not a single circumstance

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that gave dignity to it. The transition from such conditions to one where the only motive is gain must necessarily be attended with difficulty; but when the laborer shall come to appreciate his independence, when he shall know that his labor is not to be a badge of peonage and slavery, when American influences shall make him understand the dignity and importance attaching to labor under a free government, we may expect a great change for the better in the supply and character of labor.

EXHIBIT F[1].

FILIPINO AS A LABORER.

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., November 4, 1902.

GOVERNOR: In compliance with your request per letter dated October 14, 1902, addressed to Maj. Gen. George W. Davis, U. S. Army, commanding Division of the Philippines, and pursuant to indorsements thereon from the adjutant-general and the chief quartermaster of the division, I have the honor to submit the following report upon the Filipino as a laborer.

My experience with Filipinos employed in any capacity dates from April 1, 1901, on which date I was assigned to duty in charge of the United States Army transport service, and the depot quartermaster transferred to me the employees pertaining to that office, among whom were the following: Fifty-one Filipino boatswains, or patrones, 76 Filipino engineers, 96 Filipino firemen, 6 Filipino oilers, and 258 Filipino sailors.

These Filipinos were employed as crews for the various launches and lighters in the transport service at Manila and as such may be considered as skilled labor.

In addition to the foregoing there were 55 Filipino bosses, 1,260 Filipino laborers, and 13 Chinese laborers.

Of these, 5 bosses and 250 laborers were employed on the quartermaster's docks and at the commissary warehouses. The remaining 50 bosses and 1,110 Filipino laborers were designated "bay laborers" (or "stevedores") and were employed on the bay in loading and discharging cargo exclusive of coal. The 13 Chinese laborers were employed in the freight-receiving room. The Filipino bosses, Filipino laborers, and Chinese laborers are considered unskilled labor.

The skilled labor was employed by the month and paid on the 15th and last day of each month at a rate fixed by the division commander, to which reference will be made later. These employees were under the charge of the master or patron of the launch or lighter to which they were assigned. When vacancies occurred other men were secured by the master or patron and were later employed by competent authority. It frequently happened that the launch masters or patrones would discharge members of their crews and secure other men to take their places. The assignments of crews to the launches and lighters were not regarded as permanent by the crews, and as a result they would exchange with crews of other launches and lighters without reference to the office.

It was understood that should launches be required for night service or on Sundays that the crews would receive double pay for the time so employed.

The stevedore or unskilled labor (Filipino bosses and laborers) was secured by employing the bosses, each of whom secured a gang of from twenty to thirty laborers. These men were employed by the day at a rate fixed by the division commander. They were paid daily through the bosses. Each boss was given a time slip stating the number of men in his gang and the time they had worked. These time slips were certified to as being correct by the superintendent of labor and were then presented to the cashier of the depot quartermaster's office by the several bosses, who received their own pay and that due the laborers of their respective gangs, whom the bosses paid.

Ten hours was considered a day's work for this class of labor, and when extra time, or night, or Sunday work was required the laborers received pay at double the rate for the time so employed, the bosses being given the time slips covering such time.

All coal pertaining to the transport service was handled under an informal contract, the rate per ton being 40 cents on the bay and 70 cents from lighters to coal piles, or from coal pile to lighter, the quartermaster's department furnishing all lighterage. The contractor employed Chinese labor for this work. This method of handling coal was adopted because it was thought Filipinos could not do this class of work, which is considered heavier and harder than the handling of cargo to and from ships and lighters. This system was continued until May

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1, 1901, on which date the reorganization of the employees of the transport service was in effect so far as practicable, to which only such reference will be made in this report as involves changes in system of handling the Filipino and Chinese employees.

The organization of the launch crews was completed and each crew was assigned to a particular launch. A list of the crew in each case was prepared and entered in time books, of which there was one for each launch. Timekeepers visited the launches at irregular intervals, verifying the crew, and the crews were in this way made to understand that this assignment was permanent, and that they were employed to work on that launch and nowhere else unless specifically assigned by the officer in charge of the transport service. Each launch was given a number, and all property and tools were inventoried and stamped with the number of the launch, all in the presence of the launch master or patron, who was then required to sign a receipt for same. This property was verified monthly with the view of collecting the value of any shortage at the next payment. The Filipinos understood this and soon appreciated the necessity of looking after property for which they were responsible. All employees of the launches were required to comply with the regulations for launch service, a copy of which was furnished the master or patron of each launch and lighter.

It was explained to all crews that they were employed by the month, and would receive no pay for days on which they were absent, no extra pay for night or Sunday work, for which launches were specially designated when necessary, and were not required for service the next morning. This practice continued for about four months, at the expiration of which time all launches were required to work whenever called upon.

The system of semimonthly payments was discontinued June 30, 1901, from which date payments were made on the last day of each month on a pay roll prepared for each crew. There were no complaints made by the launch crews when these changes were made.

The number of Filipinos employed as crews of launches and lighters at Manila varies from time to time because of the constant changes in the launches at this port, due to their being assigned to stations elsewhere. The records of this office show that on June 30, 1901, there were 433, and October 31, 1902, 472 Filipinos employed as launch and lighter crews, rated as skilled labor, and which are classified as to duties and rate of pay as shown in the following table:

Occupation.	Rate per month, United States currency.	On rolls.	
		June 30, 1901.	Oct. 31, 1902.
Engineers	$50.00	2	
Do	40.00	8	7
Do	37.50	10	7
Do	35.00	6	5
Do	32.50	14	7
Do	30.00		8
Assistant engineers	50.00		3
Do	40.00	3	1
Do	30.00	4	7
Do	27.50	12	7
Do	25.00	5	5
Do	22.50	4	7
Do	20.00	1	
Oilers	20.00	2	4
Do	15.00	1	
Firemen	20.00	4	
Do	17.50	2	
Do	15.00	78	80
Boatswains	50.00	2	
Do	40.00	3	2
Do	37.50	12	4
Do	35.00	6	6
Do	32.50	4	6
Do	30.00	15	9
Do	22.50	5	2
Do	20.00	16	11
Quartermasters	12.50	41	42
Sailors	15.00	24	22
Do	10.00	196	177
Cooks	16.00		3
Waiters	7.50		1
Total skilled labor		472	433

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Of the launch crews on the rolls of this office, it is found from inspection of the time books that from June 1, 1901, to October 31, 1902, 91 per cent of the patrones have been continuously in the service, 5 per cent have resigned, and 4 per cent were discharged; 89 per cent of the engineers, firemen, and oilers have been continuously in the service, 8 per cent resigned, and 3 per cent discharged; while only 11 per cent of the sailors have been continuously in the service, the remaining 89 per cent resigning after about three months.

The efficiency of the launch crews, both in the engine and dock departments, has gradually improved to such an extent that within the past two months it has been deemed for the best interests of the service to replace American and European launch masters, who have been discharged for cause, by Filipino patrones, who in all cases have performed their duties as such without accident or delay and to the entire satisfaction of this office.

All bosses and unskilled (or stevedore) labor were employed as individuals by this office. They were organized into gangs of one boss and fifteen or twenty laborers, and the gangs numbered consecutively from 1. Gangs Nos. 1 to 15, inclusive, were designated as regular gangs, and all others as emergency gangs. Each boss was furnished with a time book, bearing the number of his gang, in which was entered the names of the boss and all of the laborers. The bosses were required to keep and verify the time of their respective gangs, under the supervision of American timekeepers, stevedores, and cargadores, under whose direction they worked. These time books were turned in to the general timekeeper every evening, when the gangs were dismissed, after verification, and returned to the bosses every morning, when they were verified before going to work. They were informed that they would be employed by the day; that on May 15 the daily payments would be stopped, and in lieu thereof they would be paid on the 15th and last day of each month, to include June 30, 1901, after which date they would be paid monthly (on the last day of each month), and only for such time as is shown by the time book, and that no double pay for night or Sunday work would be allowed. They were further informed that the regular gangs would first be given employment and that such additional labor as might be required would be proportioned among the emergency laborers in such manner as to give all an equal share of the emergency work. The advantage to both the employer and employees of regular attendance, without which no permanent or organized labor could be had, was explained to all concerned, and that the men who worked the best and lost the least time would be placed in the regular gangs as vacancies occurred.

Notwithstanding some of the changes may be considered radical, they were accepted by the Filipinos without complaint or comment, and work was commenced on May 15, 1901, under the organization and system of instruction briefly outlined above, each gang under the supervision of an American stevedore, cargador, wharfinger, or checker.

This Filipino labor handled all cargo, except coal, received and shipped by this office and coaled all launches and steam lighters.

All coal, except that required for launches and steam lighters, was handled by contract at a stipulated price per ton, or by Chinese labor employed by this office at 75 cents United States currency per day, and double rate for extra time and night and Sunday work. In view of the high wages demanded by the Chinese, and the cost by contract, the employment of Filipino labor for the handling of coal was commenced July 1, 1901. Laborers were employed at Cavite for work at the coal deposits at Sangley Point, and supplied from the regular and emergency gangs employed at Manila for coal work on the bay. This labor did well from the first, and while only a small proportion of the coal work was done by Filipinos during the month of July, 1901, they handled more than one-half of the coal in October, and have practically handled all coal since December, 1901.

The quantity of coal handled each month by contractors, Chinese labor and Filipino labor, with the cost in each case, the number of Chinese and Filipinos employed by this office, the rate of pay, number of days employed, the average number of tons handled per man per day and cost per ton, are shown in the comparative statement herewith inclosed, marked "A." From this statement it will be noted that the cost per ton was less and the average per man per day greater with Filipino labor than with Chinese labor or contract.

The records of this office show the average number of Filipino stevedores employed each day, including Sundays, holidays, and fiestas, during the fiscal year ending June 30, 1902, to have been: Fifty-seven bosses, at $30 per month, amounting per day to $56.22; 906 laborers, at 50 cents per day, amounting per day to $453, or a total average daily cost for labor of $509.22.

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During the same period there were transported to and from Manila:

Passengers and troops	97,106
Animals	1,609
Baggage, cabin passengers' ... pieces	63,061
Estimated weight of these 63,061 pieces baggage ... pounds	6,306,100
Estimated weight troop baggage and property (not manifested), pounds	12,000,000
Mail, 22,011 sacks, estimated weight ... pounds	1,540,770
Freight, 3,813,200 packages, estimated weight ... do	352,119,263
Coal ... do	386,691,626
Making a total of	758,657,759

of which 91,627,694 pounds were handled by contractors and Chinese labor and 667,030,065 pounds by the Filipino labor above referred to.

That a clear understanding may be had of the amount of work actually done by this labor during the entire fiscal year in handling this freight, attention is invited to the fact that where cargo is received it is first taken from the vessel and placed on lighters, then from the lighters to the dock, and from the dock to the various store houses. Subsistence stores, after being placed on the dock, are separated and transferred by lighters to the various storehouses. Where coal is stored in deposits at Cavite or on the Pasig River, it is first placed in lighters and taken ashore, then carried in baskets and dumped on coal pile. Where vessels are coaled from coal deposits, coal is carried in baskets from coal piles to lighters and from lighters placed aboard the ship, then moved again into the bunkers, where it is trimmed. It will, therefore, be noted that all this freight, including baggage, coal, and forage, was handled at least three times, and that there were actually handled during the fiscal year by Filipino labor on an average of 2,741.1 tons per day, or 3.02 tons per man (laborer) per day at a cost, including the wages of the bosses and laborers, of 18½ cents, United States currency, per ton for labor, not including stores handled for other departments by the same labor.

To avoid the delay incident to the quarantine of vessels at this port because of Asiatic cholera, a quarantine station was established on the bay from which to load and discharge all cargo and clear all ships pertaining to this office.

On April 1, 1902, 12 Filipino bosses and 240 laborers were sent to this quarantine station for duty, where they remained until June 5, on which date the quarantine station was abandoned because of cholera among the laborers. From time to time during this period the number of laborers was increased until the average number was 350. During this time these Filipino bosses and laborers remained in quarantine, working day or night as their services were required without any increase in wages other than a Filipino ration. They were brought ashore occasionally, by authority of the quarantine officer, to procure a change of clothing. That they might be held in quarantine, each gang as it came ashore was placed in a wagon and under the charge of an American employee sent to their homes, where they received their clothing without leaving the wagon, and returned to the quarantine station.

The records show that during the months of April and May, 76,276 tons of freight, exclusive of coal, were handled by an average of 350 Filipino bosses and laborers. No laborers could have worked harder or been more loyal than these Filipinos during the time referred to.

From an inspection of the time books it is found that of the 685 regular Filipino laborers employed 316 had twelve months' continuous service, 189 had eleven months' during the fiscal year, 102 had ten months' during the fiscal year, 70 had nine months' continuous service, 8 had eight months' continuous service.

The emergency labor, considering the time it was required, averaged from 90 to 95 per cent in attendance.

Attention is respectfully invited to the reports of Capt. F. A. Grant, Q. M., U. S. Army; Capt. H. W. French, Q. M., U. S. Army; Mr. Adam Neder, in charge of coal, and Mr. W. B. Moses, in charge of labor, herewith inclosed and marked, respectively, "B," "C," "D," and "E."

In conclusion, the following replies are submitted to your inquiries:

1. The number of laborers employed averaged daily 57 bosses and 906 laborers during the fiscal year ended June 30, 1902.

2. They are classified only as dock, river, and bay stevedores.

3. Each class handles baggage, freight, and coal received and shipped by this office.

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4. The only skilled labor employed are patrones, engineers, oilers, firemen, and sailors. Their classification and rate of pay are fixed by the size of the launch to which they are assigned.

5. The wages are: For patrones, from $50 to $20; engineers, $50 to $32.50; assistant engineers, $40 to $20; oilers, $20 to $15; firemen, $20 to $15; sailors, $10; bosses, $30 per month; laborers, 50 cents per day.

6. All Filipino employees are paid at the end of each month for the number of days present during the month.

7. There is no difficulty in securing good labor.

8. The laborer works from 7 a. m. to 12 m., and from 1.30 p. m. to 5.30 p. m., and, under emergencies, whenever required, with no extra pay for Sunday or night work.

9. This labor is very efficient.

10. Chinese labor was formerly employed for the handling of coal, but has been abandoned and replaced by Filipino labor, which, by practical tests during several months, averaged more tons per man per day and at a much lower rate per ton.

I prefer the Filipino labor employed by this office to Chinese.

11. The attendance of Filipino laborers has been and is excellent. They do not absent themselves after Sundays, holidays, or fiestas, nor during any such days should they be notified in advance that they will be required for work. Their physical strength is much improved and they are capable of doing as much and as hard work as any laborers we have had in the Orient.

Very respectfully,

(Signed.) J. B. ALESHIRE,
Major and Quartermaster, U. S. Army,
In Charge Army Transport Service.

Hon. WILLIAM H. TAFT,
Governor of the Philippine Islands, Manila, P. I.
(Through military channels.)

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., October 24, 1902.

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in Charge Army Transport Service,
Manila, P. I.

SIR: I have the honor to make the following report in regard to the native labor employed by this office for handling freight of all classes consigned to and shipped by this office:

When Manila was first occupied by United States troops in August, 1898, we were informed by business men who furnished labor for loading and unloading freight of ships and handling same on shore that it was impossible to secure Filipino labor, and that Chinamen were used for that purpose, as the Filipino would not work. We found this to be practically true at that time, as it was very difficult at times to procure enough labor on account of this fact to handle Government freight, so that for nearly two years after the arrival of our troops on the island much of the troop baggage and some freight were handled by soldiers.

Subsequently Filipinos were employed and competent American stevedores placed in charge of them to teach them how to work. The result of this action has been wonderful, and to-day this office is handling freight cheaper than it was possible to handle it with Chinese labor in the early years of occupation.

In May of the present year Filipino labor unloaded one ship at Calle Principe wharf and loaded her in nine hours, at a cost of 7½ cents gold per ton.

The records of this office will show that the U. S. A. T. *Dix*, 10,500 tons measurement, was unloaded in Manila Bay and the freight stored in the lighters in ninety hours, at a cost of 12 cents gold per ton.

During the same month I was present at the United States army corral when 30 Filipino laborers unloaded from a large steel lighter and passed through one side port of the U. S. C. T. *Francisco Reyes* and stored it, 1,600 packages of freight in just one hour.

While the above records may be called exceptional cases it will show what can be accomplished by native labor when required of it.

The labor used by this office is thoroughly organized, there being gangs of 20 men each under charge of a native boss. In discharging a ship one gang is usually placed at each hatch—the boss and three men remain on deck; the

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remainder go below, break out, and sling the freight ready for hoisting from the holds.

One American stevedore is in direct charge of the unloading of each ship.

The difference between this way of handling freight and the way it is handled by commercial firms is quite noticeable. One reputable firm of stevedores in this city has a native woman employed as stevedore, while other firms have no stevedore of any kind in charge of their labor; and, upon investigation, I have found that they do not take out freight either as fast or with as little breakage as our employees do under the method outlined above.

As freight consigned to this office and carried by commercial liners is unloaded and delivered to us over ship's side by stevedoring firms, we have had an opportunity to compare the difference between native labor handled by American stevedores and that labor under charge of native stevedores or no stevedores at all.

Our men leave this dock at 6.30 a. m. daily, and at 7 a. m. are at work. They stop at 12 noon and are at work again by 1.30 p. m., quitting at 5.30 p. m. Should it be necessary to work them at night or on Sundays they receive the same rate of pay as for regular hours. If required to work an hour or so overtime to complete the work on a ship, they do so willingly, and without extra pay, although it must be remembered that they are taken from this dock in the morning and returned to shore the same night by launch; they are not required to work an hour in a banca to go to work and another hour to return at night.

It is my experience that Filipino labor is much more satisfactory in every way than Chinese labor; it is not so expensive, and we can accomplish more in a day with natives than can be accomplished in the same time with an equal number of Chinese.

It is my opinion, as well as of our stevedores, that 15 of our native laborers will discharge or load more freight in one day than any equal number of Chinese that have ever worked for this department.

If a man should be injured while working for this department he is sent to the hospital and cared for until he recovers. This right to hospital treatment and feeling of security as regards steady employment, together with fair treatment, seems to appeal to the men, and I have experienced less trouble in controlling them, with as good results, so far as work is concerned, as I have had with any other labor during my lifetime.

Regarding Chinamen, my experience is that while most of them work well, at the same time they are ready to take advantage of a rush of work and ask for a higher rate of wages, and, should their request not be granted at once, will leave their employment, even though they may have been a long time in your employ and have been well treated. This has been the experience of this department.

During the early days of the late cholera epidemic, and when we had a large number of transports and about 50,000 tons of freight per month to handle, in addition to troops and troops' baggage, our Filipino labor worked faithfully day and night, at times not seeing their families for weeks, and not knowing whether they were alive or dead. I am sure Chinese would have taken advantage of the occasion to demand higher wages.

Very respectfully,

F. H. GRANT,
Captain and Quartermaster, U. S. Army,
Assistant to Officer in Charge Army Transport Service.

OFFICE ARMY TRANSPORT SERVICE,
SHIPPING DEPARTMENT,
Manila, P. I., October 28, 1902.

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in Charge Army Transport Service,
Manila, P. I.

SIR: In compliance with your oral instructions regarding my observations as to the merits of Filipino and Chinese labor to the best interests of this department, I have the honor to submit the following report:

Of the several hundred Filipino laborers employed daily in loading and unloading the ships, those who have been longest in employ work more rapidly and handle cargo more carefully than the emergency crews employed for two

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or three days when more than the usual number of ships' cargoes are to be handled. But even these emergency men work better the last than the first days. They display a desire for permanent employment. There is never any difficulty in procuring all the labor required.

The Filipino seems ready and willing to learn the improved methods of performing labor and displays considerable ingenuity in handling heavy packages. It has often been observed when an unusually bulky or awkward package is to be handled they advance ideas to each other as to the way of procedure. An American overseer, though not able to speak their language, will show them by signs a simple way. They immediately adopt it and do not have to be instructed a second time.

During the recent epidemic of cholera, when ships have been held in quarantine from three to five days, it has often been necessary to work overtime and occasionally all night. This the Filipino has cheerfully done.

There is but little so-called skilled Filipino labor in this department, confined chiefly to the engineers on the launches. They take good care of the machinery and seem to understand the principles of its construction to such an extent that minor "breakdowns" in the machinery are often repaired with crude tools in a rapid and ingenious manner.

The crews of all launches pertaining to this department are Filipinos under American launch masters, except some of the smaller ones, which have Filipino masters who have a sufficient knowledge of the English language to carry out instructions given in English. So far as navigating is concerned, it is believed the Filipino is capable to master them, but from lack of knowledge on the part of Americans of the native dialects, it is necessary at present, and will be for some time to come, to have many American masters, but they may gradually be replaced by Filipinos who have learned sufficient English to carry out orders without first having them translated. Most commercial launches are entirely manned by Filipinos, because the commercial companies well established have been here sufficient time for their representatives in the supervision of this class of labor to have acquired a knowledge of Spanish or native dialects. This has not been practicable for Americans, as their energies, especially the military, have been needed in other ways than the acquirement of foreign languages; but it must be said in justice to them that unusual advancement has been made in this direction by our American overseers, and the Filipino also deserves credit for the strides he has made in the acquirement of our own language.

But few Chinese are employed in this department, from which comparison may be drawn. These are employed, moreover, in loading and unloading small packages from the wagons at the storeroom. All the heavy work is performed by Filipinos. If new methods of handling cargo are presented to the Chinese, they sullenly accept it for the time being and immediately revert to their own methods. They are great consumers of opium, which seems to be as necessary to them as tobacco to the Filipino, but the effects produced leaves them stupid and weak; they object to working overtime without large compensation; they do not display a desire to acquire a knowledge of any other language, making it difficult to give them instructions. There seems to exist a national hatred between the Chinese and Filipinos. The average Filipino will not work under Chinese bosses, or acquire their methods, but seems anxious to learn from Americans.

I have never known of fights occurring between American and Filipinos or American and Chinese labor, but between the Chinese and Filipinos they are frequent, utilizing anything convenient as weapons. The altercations starting between two individuals often result in ten or a dozen of each class becoming engaged before police or American overseers can separate them. All this expended energy and time would be saved were they never put to work side by side.

It is earnestly hoped the Filipino labor of this department may not be supplemented by Chinese. Should it ever have under its control shops, dry docks, or marine railroads, it is believed better satisfaction would be obtained from the Filipino apprenticed under carefully selected American foremen than by Chinese. The Filipino under the Chinaman will only bring discord, indifferent results, and no improvement to the Filipino's natural ingenuity and desire to improve.

In closing it might be stated that the Filipinos permanently employed in this department have not changed in their shifts more than would be expected from American labor of the same class for over a year, and the percentage of attendance of permanent laborers is constantly increasing. Formerly it was difficult

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to get regular attendance on "feast days," but that has almost if not quite entirely disappeared. They seem satisfied to enjoy the regular holidays observed by Americans.

Respectfully submitted.

H. W. FRENCH,
Captain of Infantry, Quartermaster, U. S. Army,
Assistant to the Officer in Charge Army Transport Service.

MANILA, P. I., *October 23, 1902.*

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in Charge Army Transport Service.

SIR: I have the honor to inform you in reference to Chinese and Filipino labor. I have worked Chinese in Cavite coal yard, loading and unloading coal.

I find that in handling them they will not work unless every hour or so they are allowed to stop for rest to smoke about fifteen minutes, and they want from 12 to 2 p. m. for lunch hour.

The number of tons they unload per man do not exceed from 1¾ to 2 tons, and at $1.50 Mexican per day they are more expensive than Filipino labor.

They will not work nights or Sundays unless double pay is given them.

The employment of Filipino labor at 50 cents gold per day and only one hour for dinner, and who will work nights and Sundays if necessary at same rate of wages, will load as much or more coal per day.

When I worked Filipino labor in Cavite yard at 50 cents gold per day they averaged 2 tons per man, and sometimes from 2¾ to 3 tons, according to distance. Chinese never averaged over 1¾ to 2¼ tons per man per day.

As for bay loading, I find the Filipino average for loading and trimming is 1¾ tons per man for the past three months.

My opinion is that the Filipino labor is the cheapest and the best.

Very respectfully,

ADAM NEDER.

OFFICE ARMY TRANSPORT SERVICE,
Manila, P. I., October 21, 1902.

Maj. J. B. ALESHIRE,
Quartermaster, U. S. Army, in charge Army Transport Service,
Manila, P. I.

SIR: I have the honor to make the following statement relative to the employment of native labor by this department and under my supervision. I wish to state that I have at all times found the native laborers regular in attending to their duties.

There is employed by this department from 500 to 1,000 native laborers, and I have found that fully 95 per cent of these men worked every day that there was work for them to perform, and when laid off for lack of work were always ready and willing to return to their duties when this department needed their services.

I further state that my experience with labor has proved to me that in many ways the native laborers are superior to Chinese laborers, providing the natives are handled in a proper manner.

The majority of the native laborers employed by this department at the present time under my supervision have been so employed for the past year, and I have never had any trouble in getting these men to work Sundays, holidays, and late at night when it has been necessary for work to be done.

Very respectfully,

W. B. MOSES,
In Charge Native Labor and River Stevedores,
Under Direction of Maj. J. B. Aleshire, Q. M., U. S. Army.

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A.

Statement of coal handled by contracts, Chinese labor, and Filipino laborers, July 1, 1901, to June 30, 1902, army transport service, Manila, P. I.

[Rate and cost in United States currency.]

	By contract.			By Chinese labor.										By Filipino labor.										
				Day work (average).			Night work (average).							Bosses (average).			Laborers (average).							
	Pounds.	Rate per ton.	Total cost.	Men.	Day.	Rate.	Men.	Day.	Rate.	Cost.	Pounds.	Cost per ton.	Average per man per day in tons.	Men.	Day.	Rate.	Men.	Day.	Rate.	Cost.	Pounds.	Cost per ton.	Average tons per man per day.	
																							Tons.	Lbs.
July, 1901	16,213,200	$0.70	$5,066.69											2	5	$1.00	71	5	$0.50	$187.50	1,012,286	$0.4150	1	988
August, 1901	22,077,441	.58	5,516.48	98	4	$0.75	43	4	$1.50	$552.00	978,880	$1.26	0.81	4	12	1.00	100	12	.50	648.50	3,081,895	.4787	1	289
September, 1901	2,720,418	.69	838.30	151	7	.75	55	7	1.50	1,370.25	4,592,000	.66⅔	1.[illegible]	4	41	1.00	68	41	.50	1,558.00	14,421,811	.2425	2	691
October, 1901	5,967,360	.64	1,704.96	48	4	.75	100	4	1.50	588.00	2,665,600	.49½	2.[illegible]	8	24	1.00	165	24	.50	2,172.00	21,710,875	.2250	2	1,004
November, 1901	7,250,240	.56	1,815.06											10	20	1.00	153	20	.50	1,730.00	14,309,029	.2708	1	2,150
December, 1901	9,094,400	.49	1,989.40											14	29	1.00	298	29	.50	4,727.60	39,040,901	.2712	1	2,060
January, 1902														14	26	1.00	285	26	.50	4,069.00	28,063,936	.3239	1	1,366
February, 1902	4,928,000	.51	1,122.00											15	27	1.00	229	27	.50	3,496.50	27,919,132	.2806	1	1,971
March, 1902	10,402,560	.41	1,904.04											12	28	1.00	385	28	.50	5,726.00	33,942,482	.3778	1	806
April, 1902	4,737,600	.41	867.15											10	24	1.00	290	24	.50	3,720.00	32,130,432	.2593	1	2,217
May, 1902														10	21	1.00	265	21	.50	2,992.50	32,090,996	.2088	2	1,075
June, 1902														8	25	1.00	160	25	.50	2,200.00	21,729,344	.2314	2	739

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EXHIBIT F[2].

PHILIPPINE LABOR.

OFFICE LAND TRANSPORTATION AND GOVERNMENT CORRALS,
Manila, P. I., October 24, 1902.

GOVERNOR: In compliance with your letter to Maj.-Gen. George W. Davis, U. S. Army, requesting certain information from me regarding Filipino labor, I have the honor to state:

That during the month of September, 1902, an average month in the matter of labor in this department, I employed 941 Filipino laborers.

That of the labor regularly employed the percentage of time lost shows only 3½ per cent, or an attendance of 96½ per cent. Whereas all labor was formerly paid by the day and week, it is now paid monthly.

That I am able to secure all the labor I need at 40 cents and 50 cents United States currency per day.

This labor is classified into the following classes, to wit:

		United States currency.
Farriers	per month	$30.00
Teamsters	do	20.00
Packers	do	18.00
Saddlers	do	17.00
Trimmers	do	14.00
Painters	do	14.00
Carpenters	do	14.00
Stevedores	per day	.50
Ordinary labor	do	.40

The nature of work which each class performed is readily recognized under the headings as classified.

As far as possible I have adopted practically the civil-service rules in handling Filipino labor in this department, my effort being to arouse the ambitions of the various Filipinos who might be classified as skilled laborers.

The native farrier receives more pay than any other class of native labor in this department. There are four of these farriers in this department, and they have practically taken the places of American veterinary surgeons who have been transferred to the line or returned to the United States. Under the guidance of competent American veterinarians they have made marked advances in this profession, and are capable of treating intelligently certain hoof diseases and diseases of even more complicated character without direction.

The teamsters are the next highest paid in this department. In my report made to the chief quartermaster of the division in 1901 I expressed the opinion that while native laborers were capable of great proficiency, yet they would never be able to handle the American animals. Since then I have had occasion to change my mind. Upon receiving authority from the chief quartermaster, I broke in a number of natives to drive the coal and sanitary carts. They are not only honest and faithful in the performance of this work, but remain in the department after hours, so I am told by the superintendent of the corral, to keep their harness greased and clean, their animals curried, and their carts washed. I never found dishonesty among the drivers in the delivery of coal and wood, and I now believe the Filipino native capable of handling the escort wagon wherever the animal is at all well broken. The superintendent of the corral reports to me that there are less accidents and runaways in the train handled by native teamsters than that handled by American drivers. The cause is apparent. The American drivers to a great extent is reckless and oftentimes careless. The position of teamster is greatly sought after in this department by native, and they use every caution and are diligent in the performance of their duties in order to retain their positions. Of the 45 native teamsters in this department during the month of September, 1902, only 7 days' labor was lost. The native is docked if he is not present every morning and evening, and if he does not give a satisfactory explanation is discharged.

It is in the saddler, paint, and wheelwright shops that more skillful labor is required of the native and where he attains a greater degree of proficiency than in any other branch of this department. In the finest work in the wheelwright shop—such as the repairing and rebuilding of vehicles like carromatas, quileses,

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and carriages—he becomes an expert and almost surpasses any laborer which we can put upon this class of work.

While the American wheelwright gets $85 per month, the native starts with $14, until now there are four of them who have reached a salary of $30 per month. Their work is of the highest order, and the foreman of the wheelwright shop is undertaking to break in and train up additional Filipino laborers on account of their constancy in work and the good class of work they turn out. I believe the native wheelwright is capable in time of doing all repair work of a casual character that is needed in these islands.

All work in the paint and trimming shops is exclusively done by native laborers under a white foreman. When I assumed charge of this department all painting was done by Americans at $75 per month. While painting is not difficult workmanship, yet when carried to a degree of efficiency as in the paint shop of this department the Filipino reaches a high rank in skilled labor. The same is equally true of the trimmers. All of the upholstering and covering of Dougherty's wagons, ambulances, and carriages, as well as carromatas, quileses, etc., is done exclusively by native labor.

In the past I have made great efforts to secure white labor for this branch of work, but was never able to find more than one or two white laborers. The native laborers in the trimming shops, who handle the big sewing machines, as well as doing hand sewing, stuffing, cutting, and trimming, are men who were trained to this work either in this department or at the pony corral. I have had some trouble in retaining this class of labor. As carriage factories would open in Manila they would make a bid for the labor which had become efficient in this department in this class of work, and frequently the best men left this department, being able to secure higher wages elsewhere. This, however, is not a discouraging sign; if any indication at all, it should be to the contrary.

There seems to be no hostility between the skilled American labor in this department and the skilled Filipino. In fact, I have been surprised to see how readily the foremen of the various shops carry out my wishes in this matter in endeavoring to teach and train the Filipino in the various branches of work.

In the unskilled labor this department has been very fortunate in its handling. As an illustration, during September, 1900, all of the storehouses in the department were practically swept away by a typhoon, and native carpenters were very hard to get on account of destruction in other parts of the city and the increased demand for them. I then resorted to the unskilled Filipino labor at 40 cents a day, putting one white man to each forty in rebuilding the storehouses and corral. It was during the height of the rainy season, and it was done with remarkable rapidity and without loss to any property which had been unroofed. Since then any building which has been done in this department has been handled by white foremen and Filipino unskilled labor.

The vast storehouse now being built under contract in this department is wholly done by natives with American foremen. I have carefully noticed from day to day how well they perform this labor and have seen no evidence of loafing or incapacity in handling the heavy timbers.

The foreman of the wheelwright shop reports in most favorable terms upon the native in setting joists and in handling the saw, plane, level, etc.

Filipino laborers are never allowed to be idle in this department. The forage gang, for instance, when there is no forage to handle, is put to policing the corral or rebuilding the roads. This is equally true in the coal department.

When I first assumed charge of the department of land transportation all the coal in the quartermaster's department was on my papers and handled by me. The work was done at that time by Chinese. I had difficulty, as I thought, in securing proper results from Chinese labor. I then began an experiment of having the Chinese unload the coal on the dock and the Filipinos carry it from the dock to the coal pile, which was the long run. The results were so satisfactory that the next month I replaced all Chinese labor in this department by Filipinos, and found that the work was not only done as rapidly, but much cheaper.

The work in this department is not of a like character. The transportation which arrives here from the States is ponderous and is difficult to handle. Much of the hardware in the quartermaster's department, such as bar iron and steel anvils, horse and mule shoes, nails, tools, etc., are handled in this department and are unloaded and stored by native labor. All stores of whatsoever character, wagons, trucks, parts of same, forage, paints, oils, etc., are all handled

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by natives exclusively. Packing boxes are made and repacking of all supplies is done by natives. In fact, with the exception of the teamsters, wagon and assistant wagon masters, foremen and blacksmiths, this entire department in the matter of stores, receiving and shipping, is done by natives.

Forage weighs heavy and is hard to handle. The smallest bale of hay weighs 125 pounds and the compressed bales weigh 260 pounds. The oats average 100 pounds per sack. All hay in this department is piled to great heights. The Filipino takes the lighter bale on his shoulders and carries it over a hundred feet in the air, never putting it down until it reaches the point where it is to be laid, returning for another trip and continuing with little show at skulking. In the case of the larger bales two handle them, or else they are passed from hand to hand. This labor gets 50 cents gold per day.

The other labor throughout the storehouses and that which tends to extra stock, waters and feeds the animals, and polices the corral, is rated at 40 cents gold per day.

When I first assumed charge of this department in August, 1900, all labor was paid by the day, except in a few cases where it was paid weekly. I did not believe it possible at that time to pay them any differently, or that they would accept new conditions. It involved a vast amount of labor and had a demoralizing effect upon the Filipinos themselves. At that time all labor needed was secured through patrones or bosses. While I and other quartermasters in the city would pay the native himself for the work performed, he would in turn put it in the hands of the patron, who would extract a certain percentage, giving him the balance. This was the hardest problem which we had to meet; if we attempted to prevent it, the patrones would prevent us from securing labor. On two occasions all the loading and unloading in this department had to cease because I discharged the patrones and stationed guards to prevent laborers from giving their pay to the patrones. A continuous warfare on this system of an anterior date has now resulted in a complete alienation of laborer and patron as far as this department is concerned. The Filipino has become thoroughly convinced that not only is he independent of the patron, but to be subservient to him is against his interests. I believe this was largely brought about by paying the labor first once a week, then twice a month, and later on monthly.

Tagalog and Spanish interpreters would tell them, as they were paid, not to give up any of their money to anyone, and that they could always get work here. I knew of only one case where a white man in authority attempted to collect from the natives, and an imprisonment in Bilibid Presidio for six months had a wholesome effect.

The pay of native laborers in this department has only once been increased since I assumed charge. The native labor, which was formerly paid 40 cents gold per day for stevedoring, made a demand for 50 cents, which was the amount paid by the stevedores of the army transport service, and this advance was met. One hears a great deal about the high rate of pay of native labor in this branch of the quartermaster's department; reference to figures above will show this to be untrue. As labor became skilled it has been classified and the rate of pay fixed; but there has been no material advance in the pay for labor in this department since August, 1900. The men work for the same sum as they did then.

I became thoroughly convinced, on assuming charge of this department, that the Filipinos were entitled to the labor of these islands as far as it was possible to give it. I have made every effort—at times it seemed almost a sacrifice—to advance this cause. My efforts in this direction, however, have more than repaid me for the experiment, as I am not only able to get all the labor I want, but have seen the Filipino develop from what might be termed a shiftless laborer to a constant worker. As long as he was paid by the day, and his work was uncertain, it mattered little to him whether he laid off a day, or two, or even three, within a week. He is now paid by the month, and under no conditions is this rule broken.

The following facts which are taken from the time books and pay rolls of this department for the month of September show a result which surprised even me in the matter of constancy in their work.

Take the number of men employed regularly for the month of September, which were 643, and the working days at 26, the total number of days is 16,718 for the month, against time lost 583 days. This shows a percentage of time lost of 3½ per cent, or an attendance of 96½ per cent. The number of emergency or extra laborers is not included in this percentage.

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When a ship is to be discharged I take on what is known as emergency or extra labor, work it for a week or two, as the case may be, and then drop it at the end of that time, but wherever the native is employed by the month and paid by the month, the books show that the percentage of absentees is not greater than among the American labor of this department. Without going into more complicated figures, I doubt very much if the American labor would not have a greater percentage of absentees in proportion.

Owing to the fact that the civil governor asked most particularly about the constancy of Filipino labor, these figures have been carefully made and are fully reliable.

As to the physical strength of the Filipino for lifting and doing other strong work, the remarks made above in the matter of their handling forage would illustrate their capacity for work of this character. What they lack in physical strength they seem to make up in knack or a physical trick which they exercise adroitly in handling heavy cargoes.

I fully realize that the conditions in the provinces are not so favorable as they are in Manila for the organization and development of labor, but I am of the opinion that while the progress may be slower there than here, still the same evolution and development will occur, and will become all the more rapid as the native becomes convinced of the sincere and earnest attitude of the Government toward his labor.

I have the honor to attach hereto extract copies of my reports made to the chief quartermaster of the division in the year 1901 and the year 1902, which, taken in conjunction with this report, will give a practical illustration as to the development and evolution which have been made by native labor in this department since August, 1900.

Very respectfully,

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation.

His Excellency WILLIAM H. TAFT,
Civil Governor of the Philippines, Manila, P. I.
(Through office of the chief quartermaster of the Division.)

[Extract copy of annual report for the fiscal year ending June 30, 1902, forwarded to the chief quartermaster, Division of the Philippines, Manila, P. I.]

* * * * * * *

At one time emergency native labor was paid at the close of each day's business, and native labor employed regularly in corrals, storehouses, wood and coal yard, and on forage was paid semimonthly. Now they are all paid once a month, same as white labor.

Those persons discharged during the month are paid on same day discharged on an open roll.

In connection with the employment of native labor, I desire to state that two years ago it was almost impossible to employ any large number of men except through the padrones, who exacted from the men at least 20 per cent of their wages; in fact it was the custom at one time for the laborer to turn over his entire earnings to the padrone, who kept that proportion of the money he saw fit.

This office undertook to break up the custom so far as this department was concerned and succeeded. The padrones were kept away from the premises, and the men made to understand that they were hired direct, and were under no obligation to anyone, that the money they earned was all theirs and that no portion of it should be given the padrones.

In several instances it was discovered that the native foremen were taxing the men under them a certain percentage of their earnings. The foremen were promptly discharged and the reason therefor explained to the men.

In one case a white foreman was detected in this practice. He was discharged, arrested, prosecuted in the criminal court, and sentenced to a term of imprisonment for the offense. This had a most wholesome effect on all concerned.

[Extract copy of annual report for the fiscal year ending June 30, 1901, forwarded to the chief quartermaster Division of the Philippines, Manila, P. I.]

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It is the policy of this office to utilize native labor wherever it is possible. The bulk of the labor in the paint shop is done by natives. They assist in the

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repair shops, the veterinary hospitals, in the saddlers' shops, and in rigging aparejos. They also do the stevedore work in the shipping of forage, fuel, etc.

It may be of interest at this point to note that the native labor is capable of the most expert workmanship in many branches of the quartermaster's department. While they do not make good teamsters, solely by reason of the fact that they do not possess the necessary strength to handle the army mule and draft horse, yet as painters, carpenters, saddlers, trimmers, etc., they excel, and while the American occupation has raised the price of native labor, still it remains at a very low figure when compared with other labor in the islands.

* * * * * * *

I am convinced that under the direction of American foremen native labor is capable of attaining the greatest excellence in the branches above enumerated. Moreover, there appears to be no friction whatever between American and native labor, the two working side by side in perfect harmony and without any racial prejudices. The native seems anxious to learn the American methods, and in this department applies himself to carrying out the directions of the American foremen. The importance of this matter can not be exaggerated, for it seems to be opening up a solution of what would otherwise be a very difficult problem in the government of these islands. An earnest effort has been made in this office, wherever the races come together in great numbers, to bring about good feeling and fellowship between them. The natives have been taken into the shops, and the American foremen have evinced at times a patience and an earnestness in directing them in the skilled artisan's work which has surprised me, and which illustrates to a marked degree the liberal mindedness of the American workman.

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In this connection it may be well to call attention to the excellent work of the Filipinos as carpenters when working with skilled American labor and under its supervision. For a time an effort was made to secure Filipino carpenters; but, this being impracticable, unskilled labor was employed, and very little instruction was needed to make it efficient with the saw, the plane, and the level.

* * * * * * *

One hears a great deal of the necessity of introducing Chinese labor into these islands to meet the demands. It has been my experience that any labor which can be performed by the Chinese can be performed equally well by the Filipinos. The latter, moreover, have marked advantages over the Chinese, inasmuch as they are more amenable to discipline, more imitative in their methods, more enthusiastic in their work for the work itself, and more easily assimilated by American workmen. While most of the coal is unloaded in this office by Chinese labor, employed by contractors, yet all the loading of coal from this office is done by Filipino workmen at $0.40 gold per day. I have studied carefully the efficiency of these two classes in this particular work, and I unhesitatingly pronounce in favor of the Filipino. The Filipinos are certainly far superior to the Chinese in loading and unloading forage. Moreover, they show adaptability in handling the live stock and in workmanship in the repair and saddlers' shops, which I do not believe can even be equaled by the Chinese labor in these islands. I have dwelt at some length on the efficiency of Filipino labor, which as yet is in its infancy in expert work, for the reason that I have to handle a vast amount of it, and have studied it to an extent where I think my opinion may be of some value.

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A true copy.

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army, in Charge Land Transportation, Manila, P. I.

I am satisfied that the labor of this department is now entirely freed from the padrones. The men appreciate the new order of things, and are apparently contented, and, notwithstanding the demand, at any time this office can readily secure all the labor required.

The Filipino is not dissimilar to the majority of mankind in that he is anxious to obtain regular employment, and when secured will do all in his power to retain it.

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While the wages paid the natives are somewhat in excess of the wages paid in the past under the Spanish régime, still they are very low, but this enables the Filipino to provide something else than rice and dried fish for his family.

When once a native becomes accustomed to eat meat once or twice a week and to provide the same for his family, from that time he can be looked upon as a high-class and steady laborer, and works willingly and hard in order to insure his family from a return to the old conditions which confronted him and his.

The fact that the men are paid regularly, furnished steady employment, and are not paying anyone for the privilege of working, is having its effect on the laboring classes throughout the city in getting away from the clutches of padrones and others who have been robbing the laborer of his earnings.

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A true copy.

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army, in Charge Land Transportation, Manila, P. I.

OFFICE SUPERINTENDENT LAND TRANSPORTATION,
Manila, P. I., October 23, 1902.

Capt. A. W. BUTT,
Quartermaster, U. S. Army, in Charge Land Transportation,
Manila, P. I.

SIR: Replying to yours of this date as to my experience in regard to the Filipinos as teamsters, mechanics, and laborers in this corral, also in answer to your question as how they compare with Chinese laborers, I have the honor of submitting the following report, based upon my personal observations in this corral and as superintendent transportation of the China relief expedition:

Filipinos as laborers.—I would respectfully state that they have proven highly satisfactory, and it is remarkable, out of the large number employed, how few are absent during the month. The percentage is less than 5 per cent.

As teamsters.—The experiment has been a great surprise to me. During the past twelve months train No. 5, consisting of 45 carts of different kinds, working one mule each, has been handled entirely by native teamsters, excepting the wagonmaster and the assistant wagonmaster, who are Americans. In care of these animals and harness no fault can be found. Each one seems to try to have a better-looking rig than the other. I doubt, however, whether they will be able to handle with safety more than one horse until they become accustomed to the large draft animals. They handle the escort wagon train in some departments in the city now, but owing to their timidity I have not, up to present time, utilized them on anything but the single American horse or mule. I have in his train more than twenty native teamsters that have been driving for the past twelve months, and during that time they have not been absent a day. This may in a measure be due to the strictness of the rules of this corral, yet, nevertheless, it shows where they are properly handled they make steady and faithful men.

Native mechanics.—We employ 50, mostly as trimmers and painters. Their work has been most satisfactory and daily attendance prompt.

Native laborers.—In the corral proper are employed a great number, who are used to police the yard and stables and taking care of extra stock. Fifty are used in the different storehouses to take care of the different articles stored therein, and in every instance their services have been faithful and satisfactory. The supply of each kind has at all times been more than equal to the demand.

Native laborers v. *Chinese.*—Since my arrival in the Philippines I have had no experience with Chinese labor, yet during the ten months I was in China with the China relief expedition I had to use Chinese labor exclusively in the same capacity as I now use Filipino help, and for this work I prefer the Filipino, as he is quicker to pick up a thing, and at the same time takes more interest, consequently more pains with his work.

Respectfully,

J. E. COLE,
Superintendent Land Transportation.

A true copy.

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army, in Charge Land Transportation.

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MANILA, P. I., *October 24, 1902.*

A. W. BUTT,
Captain and Quartermaster, U. S. Army,
In Charge Land Transportation, Manila, P. I.

SIR: In reply to a question as to what I think of the efficiency of the Filipino laborers, I have the honor to report that I have ever found them as mechanics to be steady and industrious. The blacksmiths, wheelwrights, saddlers, painters, trimmers, and carpenters, in this department will average in skill with any class of mechanics, taking them as we pick them up. Their attendance averages 95 per cent.

I would recommend that more blacksmiths and wheelwrights be hired, as this is a good place to teach them the use of American tools.

Respectfully,

C. F. LANE,
Superintendent of Shops.

A true copy:

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
in Charge Land Transportation, Manila, P. I.

OFFICE LAND TRANSPORTATION,
Manila, P. I., July 25, 1901.

The CHIEF QUARTERMASTER,
Division of the Philippines, Manila, P. I.

SIR: I have the honor to request authority to employ Filipinos as teamsters. I am convinced that by judicious handling the Filipino can be taught in a very short time to handle a team of mules or horses in an escort wagon. I tried the experiment, introducing them in the rigging shop, saddlers' shop, and paint shop; also as farriers, and lastly as packers. The paint shop is now run entirely by native labor, with the exception of one American foreman, and in every branch in which they have been trained with patience and earnestness they have shown an adaptability at the work which is surprising.

I have had the school for native packers running only for a short time. They take to the pack readily, and, after getting accustomed to the mule, do good service as mounted packers.

My idea is to take picked natives, place them on the escort wagons, teach them slowly the various parts of harness, how it can be mended if it should break while on the road, and drill them in the important but minor details of harnessing their teams. At first I would put them on the dump and sanitary carts, where they would have to handle only one horse or mule. Most of these animals which are used for this purpose are docile and well trained, and I would anticipate little trouble in substituting, by degrees, of course, native for American teamsters. I do not desire to make this change radical or all at once, but merely wish to prepare for a day when this office will be compelled, more or less, to rely on natives as teamsters.

I believe if granted this authority it would have a good effect on the natives themselves, as I have always found them ready to respond to any effort to advance them in the direction of well-organized labor. To this end I ask authority to pay native teamsters $20 gold per month.

Respectfully,

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
in Charge Land Transportation.

A true copy:

ARCHIBALD W. BUTT,
Captain and Quartermaster, U. S. Army,
in Charge Land Transportation, Manila, P. I.

HEADQUARTERS DIVISION OF THE PHILIPPINES,
Manila, P. I., November 5, 1902.

His Excellency the GOVERNOR,
Philippine Islands.

SIR: The opinions Captain Butt expresses respecting value and effectiveness of native labor are concurred in, but the payment of wages to natives such as now prevail, it seems to the undersigned, is all wrong: first, because it is not

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necessary; second, because it fixes an unalterable standard which all others wish to profit by; and third, because it confuses and disturbs all labor values.

The policy of the army in Manila, it seems to me, in respect to wages paid is about as bad as bad can be, but no one person has now the power to correct it. The price of hemp, sugar, coffee, and copra is fixed in the great consuming centers of the world, and are subject only to such fluctuations as supply and demand cause. Americans set a pace respecting remuneration of labor that none without a national treasury behind can follow. The fact that labor now costs twice or thrice as much as formerly has not resulted in a corresponding increase or any increase in the value of hemp in London or of copra in Havre, It seems to me that the expansion of the cost of labor here has worked a great injury to the Filipino people and their commerce.

In the Quartermaster's Department of the Army, at various headquarters, there are now employed over 227 persons who receive over $100 gold per month; at the same places there are an equal number who receive from $100 down to $40 per month, and it seems to me that almost all these persons should be natives and that the general policy of the military here should be to utilize the services of the Filipino wherever possible, but it is not easy to do this, as most of our officers are too much disposed to condemn the native and to insist that only American clerks, mechanics, etc., are able to do what is required of them.

Very respectfully,

GEO. W. DAVIS,
Major-General, U. S. Army, Commanding.

EXHIBIT F[3].

CITY ENGINEER OF MANILA—LABOR.

CITY OF MANILA, MUNICIPAL BOARD, SECRETARY'S OFFICE,
October 31, 1902.

SIR: Replying to the request of the honorable civil governor, of recent date, relative to the labor employed by the city, I am directed by the municipal board to herewith hand you the inclosed report thereon by the city engineer, which is concurred in by the board.

Very respectfully, (Signed) BERT EDDY,
Acting Secretary.

THE ACTING EXECUTIVE SECRETARY,
Manila, P. I.

[Inclosure.]

CITY OF MANILA, DEPARTMENT OF ENGINEERING AND PUBLIC WORKS,
Manila, P. I., October 30, 1902.

SECRETARY MUNICIPAL BOARD,
Manila, P. I.

SIR: I have the honor to submit, in compliance with the request of the governor, the following replies to questions regarding the labor employed by this department:

1. Q. The number of laborers employed?—A. The city employes 1,714 laborers of all classes.

2. Q. Whether they are classified, and if so, into how many classes?

3. Q. What the nature of the work which each class does is?

2 and 3. A. The employees group, generally, under three heads—overseers, mechanics, and laborers. The laborers are usually divided into two or three classes, the more important work being given to the higher class.

4. Q. Whether they employ any skilled labor, and whether that is classified?—A. Mechanics and skilled laborers are not regularly classified, but are graded in pay according to their skill.

5. Q. What the wages are which are paid by them to each class of laborers?—A. Ordinary laborers are paid $1, 80 cents, 70 cents, and 60 cents per day, local currency. A few assitants to janitors get 50 cents and 40 cents.

6. Q. When the wages are paid, whether at the end of each day, at the end of each week, or at the end of the month?—A. All wages are paid monthly.

7. Q. Whether they have difficulty in securing labor?—A. No difficulty is experienced in securing ordinary labor. It is not always easy to find skilled labor for temporary employment.

8. Q. How many hours a day the laborers work?—A. Eight hours constitute a day's work.

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9. Q. Whether their labor is efficient or not?—A. Labor is fairly efficient and is improving. Labor in the city compares very favorably with that in the provinces. At present, considering wages and efficiency, work costs about 20 per cent to 25 per cent more than in the United States.

10. Q. Whether they employ any Chinese labor for the same work, and if so, how in efficiency the Filipino laborer compares with the Chinese?—A. No Chinese labor is employed by the city. Experience on contract work indicates that a Chino laborer will do about 20 per cent more than a Filipino. Their value is further augmented by the fact that they require less close superintendence.

11. Q. I should also like to ask particularly with reference to the constancy in attendance of the laborers; whether they lie off for a day or two after Sunday; what their physical strength is for lifting and other hard work; how the rates paid by the city compare with those paid by merchants for similar work?—A. The best grade of laborers and mechanics are as steady as could be wished. The class of men that spend Sundays at the cock pits around Manila are not to be relied upon after Sundays and fiesta days. This class, at least on the city rolls, is decreasing. The capacity of laborers for heavy work is quite up to the standard of their size. They are, however, not as willing to exert it as other races. Much can be gotten out of them under excitement or by stimulating them. As a rule the wages paid by the city are equal to those paid by private concerns. In some cases higher rates are paid to attract good men for a particular purpose. On an average our rates are probably somewhat higher for this reason.

Respectfully submitted.

(Signed) ROBERT MCGREGOR,
Captain of Engineers, U. S. A., City Engineer.

[From Report of the Philippine Commission, 1903, part 1, page 54.]

THE LABOR QUESTION.

American and foreign business men continue to complain of the difficulty in securing good labor. This question was discussed in my last annual report, and nothing has occurred since that time to change my views. I think it would be a great political mistake to admit the Chinamen freely into these islands as laborers. I am convinced that the Filipino, as conditions settle, can be made a good laborer; not so good as the American, not so good as the Chinaman, but one with whom it will be entirely possible to carry on great works of construction. We are now employing 2,500 Filipino laborers on the Benguet road, and our engineer reports that, wages considered, they are doing good work. We had an unfortunate experience in obtaining labor for this road, due to a misunderstanding with the proposed laborers, and to the fact that the men were obtained from an undesirable class in Manila and the neighboring provinces. It was fairly inferable from the facts that the persons who agreed to furnish the laborers, either intentionally or unintentionally, misled the laborers as to the terms upon which they should be employed.

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The Atlantic, Gulf and Pacific Company, which is engaged in building the great Manila port works, needing in its employ from 500 to 1,000 men, has adopted the system of making the laborers comfortable and at home, and now can procure more labor than it needs, and good labor, too. The following letters from the vice-president of the company seem to leave no doubt upon this point:

MANILA, *July 2, 1903.*

SIR: Answering your esteemed verbal inquiry as to our success with the Filipino labor, we beg leave to state as follows:

First. We believe that Filipino labor can successfully be used. We are employing about 1,000 Filipinos, which is a practical demonstration that this statement is not a theory.

Second. To successfully employ Filipino labor is, to the American employer of labor, a new business, which has to be learned. If he can not learn it, he can not do business in the Philippine Islands.

Third. In general, the Filipinos have to be taught how to work. This requires a considerable proportion of intelligent high-grade American foremen and mechanics.

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Fourth. The way to keep the Filipino laborer permanently in one's employ is to so arrange his surroundings that he is better off and more contented there than anywhere else. This we have attained by means of providing homes for the Filipinos and their families; also amusements, including Sunday fiestas, and schools where their children may be educated.

Fifth. We are opposed to the introduction of the Chinese. The only argument that we can see in its favor is that it may somewhat expedite the development of the resources of the islands. This temporary advantage is, we believe, overbalanced and overwhelmed by the ultimate injury to both the Americans and natives in the islands.

Sixth. We believe that the greatest need of the islands is the abolition of the Dingley tariff as far as it applies to the Philippines. We want the American market, not the Chinese laborer.

Very respectfully,

ATLANTIC, GULF AND PACIFIC COMPANY,
By H. KRUSI, *Vice-President.*

Hon. WM. H. TAFT,
Governor Philippine Archipelago, Manila, P. I.

MANILA, *November 12, 1903.*

SIR: Referring to your esteemed verbal request to state whether our subsequent experience with the labor situation here is in accord with our letter dated July 2, on this subject, would state that our experience since that time has confirmed us in our opinion therein advanced. We are having no difficulty whatsoever with our Filipino labor, who are doing the bulk of the work under our harbor contract.

The well-known civil engineer, Maj. C. F. Case, was recently at our quarry, and can advise you, if desired, as to the state of affairs there.

I wish to strengthen the statement made in my former letter with reference to the use of American foremen and mechanics. These men are the backbone of our organization, and a certain proportion of them are absolutely essential to the success of any enterprise requiring labor. They are required both to lead and instruct the Filipinos. They must be practical men and not afraid to work with their own hands. Our experience is that about 8 per cent of American foremen and mechanics is advisable.

We are firmly convinced that the best interests of the Philippines demand the use of Filipino and American labor, to the exclusion of the Chinese.

Very respectfully,

ATLANTIC, GULF AND PACIFIC COMPANY,
By H. KRUSI, *Vice-President.*

Hon. WM. H. TAFT,
Civil Governor Philippine Archipelago, Manila, P. I.

I also append the report of Captain Couden, of the United States Navy, upon the capacity of the Filipino for labor. He has charge of the large number of laborers employed at the Cavite navy-yard. It is marked Exhibit O.

The new electric street railway company of Manila, which is just beginning its work of construction, has had no difficulty in securing all the labor it desires.

The Commission employed Messrs. Norton and Drew as railroad engineers to make a reconnaissance survey for trunk lines through the island of Luzon. This report has been published, but will be hereto appended, for the sake of convenience, as Exhibit P. Mr. Norton is quite discouraging in regard to the possibility of securing native labor for the construction of railroads. I think that the facts do not justify his position in this respect. The Manila and Dagupan Railway was built with native labor, and the extensions which are now being constructed under franchises granted by the Commission are being built by the same labor. It is possible that were a very general system of railroad construction begun all at once in the islands, the supply of laborers here will be found deficient. In such contingency the emergency could be met by special legislation permitting use of cooly labor for a short period; but I anticipate no such necessity.

There is more importation of Japanese labor, but it has not as yet reached any proportion likely to have an effect upon the labor market.

THE EFFECT OF LABOR ON THE INVESTMENTS OF CAPITAL.

There is no doubt that the iteration and reiteration of the deficiency in the supply of labor in the Philippine Islands have had the effect of frightening American investors of capital from coming into the islands. The Commission

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is strongly desirous of encouraging American capital to come here, but it should be noted that if American capital declines to come that English, Belgian, and other foreign capital is merely awaiting the franchises which are requested for railroad and other constructive enterprises, and that it will be the duty of the Commission to grant such franchises for the benefit of the islands. The owners of English capital already invested in the Manila and Dagupan Railway have accepted two franchises granted for the construction and operation of branches for that railway, and are very anxious to secure other franchises extending their railway in other directions. They are sufficiently familiar with the possibility of securing native labor and of making it available for reasonably economical construction of their works not to be frightened away from the accepting of such franchises and making such investments. A reluctance on the part of American investors will certainly lead to the acceptance of their propositions. It seems to me that this much ought to be said by way of warning American investors that when later on they shall come into the islands, and shall find foreign capital strongly intrenched in many profitable enterprises, they will have only themselves to blame for a failure to seize the opportunity when it was offered them.

The disposition to harken to pessimistic maligners of conditions in the Philippines may prove to be, in this sense, quite costly.

EXHIBIT O.

REPORT OF CAPT. A. R. COUDEN, COMMANDANT, U. S. NAVAL STATION, CAVITE, ON FILIPINO LABOR EMPLOYED AT THE NAVY-YARD.

UNITED STATES ASIATIC FLEET,
PHILIPPINE SQUADRON, FLAGSHIP RAINBOW,
Cavite, P. I., November 13, 1903.

SIR: I inclose herewith a copy of a communication from the civil governor of the Philippines, with the request that you submit the report therein mentioned for transmission at your earliest convenience.

Respectfully,

YATES STIRLING,
Rear-Admiral, U. S. Navy,
Commander of the Philippine Squadron, United States Asiatic Fleet.

The COMMANDANT,
U. S. Naval Station, Cavite, P. I.

OFFICE OF THE CIVIL GOVERNOR OF THE PHILIPPINE ISLANDS,
Manila, November 12, 1903.

ADMIRAL: I am informed that Captain Couden, U. S. Navy, as the commandant of the navy-yard at Cavite, has had a large experience in dealing with Filipino labor, and as in my annual report I feel obliged to make some reference to the subject it would give me great pleasure if I could have the views of Captain Couden in this matter. I have spoken to him informally in regard to it, but I take this more formal method of securing the report.

With the hope that my request may be granted, believe me,

Sincerely, yours,

WM. H. TAFT,
Civil Governor.

Rear-Admiral YATES STIRLING, U. S. Navy,
Commanding Philippine Squadron, Cavite, P. I.

U. S. NAVAL STATION, *Cavite, P. I., December 12, 1903.*

SIR: Referring to your letter of November 13, 1903, transmitting a letter from the Hon. W. H. Taft, civil governor of the Philippine Islands.

2. There are large numbers of Filipinos employed at this station in all capacities, from common laborers, writers, copyists, minor clerks, to mechanics, including boat builders, machinists, boiler makers, leather workers, sailmakers, flag makers, ship fitters, riveters, blacksmiths, and all the various trades and callings of a naval repair yard.

3. As to common labor, when a gang of men is employed on one sort of labor continuously they become after a time very satisfactory; for instance, we have

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a gang handling coal, and no better men for the work could be asked. It is possible to observe this labor and to readily determine its character, and the cheerfulness and activity displayed is surprising and commendable. These men are employed by the day and not by the ton handled.

4. Common labor, where it is of a changing character—for instance, piling lumber one day, loading cascos another, digging trenches, cleaning up a piece of ground—seems unsatisfactory; they are not quick to work in unison and with efficiency. Desultory work, such as keeping the roads and walks cleared of all rubbish, leaves, etc., is always open to view, and as in all parts of the world such labor is lazily and inefficiently performed by the least capable and least ambitious. On the whole, I believe the common labor here at Cavite is fair and that it is improving from month to month.

5. *Clerks, writers, and copyists.*—There is a tendency more marked here than in the United States to seek employment in these grades, but the tendency has very noticeably diminished within the last year, as it has been vigorously discouraged. They make excellent copyists and typewriters, neat and rapid, but are much handicapped as to usefulness by their lack of English and the consequent necessity of making an original smooth copy. The younger boys are rapidly picking up English, and this will much increase their value in these occupations.

6. We build here many ship's boats and do it at a constantly decreasing cost; in this department we have an excellent American foreman, who has now a competent and faithful set of employees. They are very industrious; an idle man is never seen; they do good work and exhibit a desire to do the best possible.

7. Boiler makers are doing good work, and they show a marked improvement in the last year; ship fitters and riveters are good and improving.

8. The older sailmakers who learned their trade under other systems are faithful workers, but can not work from a plan or sketch on a reduced scale, while the younger men who are now learning the trade exhibit great interest and quickness in picking up our methods, and will, our chief sailmaker believes, make most excellent workmen, capable of planning and executing work as foremen. The flag makers, all Filipinos, make the neatest and handsomest work I have ever seen and are entirely satisfactory. This work has all been learned at this yard.

9. Machinists are employed in large numbers and have improved very noticeably; some of the younger men who have received all their training here are very quick to learn and are found the most satisfactory when new machines from the United States are introduced. Men who are really little more than boys are running such machines very satisfactorily.

10. *Apprentices.*—Within the last six months we have commenced entering apprentices in the various trades. The number of these was fixed by the Navy Department in accordance with the practice at home. The system promises such excellent results that a large increase in the number allowed has been asked for and will probably be granted. A very few years under this method will make this a school for the education of mechanics, not only for our own needs but for the general good of the islands. There will grow such a demand for efficient handicraftsmen in the mechanical arts in the various ports of these islands that a succession of apprentices, becoming journeymen, will commence their journeyings and spread the gospel of steady industry and its rewards.

11. *Molders.*—Molding is the only trade in which we have no Filipino men employed. It appears that no foundry was ever established here (Cavite) in which Filipinos were employed; all of our molders are Chinamen, receiving abnormal wages. We have, however, commenced the apprentice system in this branch and hope to make progress in their training, though the circumstances are very adverse.

12. *Leather workers.*—The making of magazine buckets and similar articles of heavy leather for use in connection with the handling of ammunition is successfully carried on, the men receiving their instructions here recently.

13. There is a marked improvement in the carpenter's gangs observable within the last year.

14. While comparisons between Filipino labor and that of Chinamen and others is futile because of the many variable quantities that have different values according to one's point of view, there is no doubt in my own mind that Filipino labor will prove more satisfactory at this station than any foreign labor, and that in the trades it will be satisfactory; that its employment will be of great value to all the people of the province, and indirectly to other parts of the islands, in educating them to see the advantages of stability and quiet

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and the opportunities for permanent betterment of their own and their children's lives. An improvement in the physical condition of the workmen, and more especially of the younger generation, is visible within the last year, due to the gradual improvement in food because of the greater capacity to purchase, and greater demands of the system because of greater industry.

15. Inclosed herewith are recent reports from the various heads of departments of the station on this subject.

Very respectfully,

A. R. COUDEN,
Captain, U. S. Navy, Commandant.

The COMMANDER IN CHIEF,
U. S. Asiatic Fleet.

U. S. NAVAL STATION,
Cavite, P. I., December 7, 1903.

SIR: Referring to the commandant's No. 2483, dated November 16, 1903, for a report in detail of the progress made by Filipino labor, skilled and unskilled, during the past year, I have the honor to submit the following:

SKILLED LABOR.

(a) *Machinists.*—Machinists have progressed to a very considerable extent in the ordinary routine work of their trade; they are, however, noticeably handicapped by their inability to read a drawing or blueprint, and in this respect they do not seem to make any marked improvement.

(b) *Electrical machinists.*—Electrical machinists have progressed very little in their line of work. They are able to run wires and make ordinary connections, and have also learned to make repairs on small motors and to rewind armatures; but if the connection is in any way intricate, as in a cross-connected armature, they do not seem to be able to grasp the method. However, there is very little of this class of work, and no great advancement in proficiency could be looked for. One of the worst faults they have is that if on completion of a job the work shows there is an error somewhere, they are totally unable to retrace their work and find wherein is the fault.

(c) *Carpenters.*—Carpenters have shown the greatest improvement in the class of work that is done in this department, which, however, is not of a high order. They have done some very clever work in the way of desks, file cases, etc., but the bulk of their work has consisted in the making of chart boards, tool handles, and rigging appliances, which they have done well and satisfactorily.

(d) *Riggers.*—There is very little fault to find with the manner in which the employees of this subdepartment carry out their work. Most of them are old and experienced hands; and as there is very little, if any, technical knowledge required in their line, they are apparently steadily improving.

(e) *Sailmakers.*—The quality of work that is being turned out by the sailmakers is, on the whole, very good; but as the ability to read a print or follow a plan is essentially a quality of an expert sailmaker, and one which none of these men possesses, constant supervision on the part of the foreman is imperative. The chief sailmaker tells me he accounts for this by the fact that most of his men are old hands and learned their trade under the Spanish rule, a method much more crude than the one in present use.

(f) *Flag makers.*—These women have learned to work from a sketch or plan and have attained such a degree of proficiency that very little, if any, supervision on the part of the foreman is necessary. Neatness and dispatch characterize their work, and its quality is good. Their progress has been really marked.

(g) *Clerks.*—The clerks are as a rule improving. With hardly an exception every man is proficient in the individual task assigned him, one in particular having acquired remarkable speed on the typewriter. All of them are, however, at a great disadvantage in not being able to construe English to any extent, and but one or two appear to go to any pains to overcome this.

UNSKILLED LABOR.

This class adapt themselves very readily as a rule to the work given them, and are, the younger men particularly, apparently anxious to learn. In this respect it is thought worthy of mention what the chief sailmaker tells me of

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the apprentices in his department. They are naturally apt; and as they have nothing to unlearn (as have most of the older hands), what they are once taught they readily grasp, and he is, he says, sanguine of their developing in time into really first-class workmen.

In summarizing the progress made by all subdepartments, both skilled and unskilled, it would appear that the underlying principle which will tend to ultimately retard Filipino labor from becoming really A1 workmen is their low degree of intelligence and consequent lack of a knowledge of the fundamental theories of their respective trades, until they acquire which there is always the possibility that, if left to their own devices, some new phase of their work will present itself and which they will be unable to solve unaided.

Very respectfully,

J. F. PARKER,
Commander, U. S. Navy, Equipment Officer.

The COMMANDANT,
U. S. Naval Station, Cavite, P. I.

U. S. NAVAL STATION,
Cavite, P. I., December 3, 1903.

SIR: Referring to the commandant's letter dated November 16, 1903, which requests a full and complete report on the progress of Filipino labor during the last year, I have the honor to report as follows:

2. As the efficiency of the Filipino mechanic is so closely interwoven with the efficiency of the department of which I have charge, I dwelt somewhat on the subject in question in my annual report dated July 6, 1903.

3. Being head of the department, my recommendations were based necessarily on grounds to promote the efficiency of the department, the simultaneous improvement of the Filipino being alluded to more as incidental.

4. I quote below verbatim from my annual report and will comment later in this communication, giving my views at the present time, and showing where I have modified my views, if I have done so.

5. *Administration of department.*—"1. The principal difficulty in the administration of this department is the want of the proper supervision in the individual shops. This is a loss to the Government financially. In addition to the business side, there seems another phase worthy of consideration in connection with this.

"2. The Government has been spending stupendous sums of money for the education of the Filipino, and is continually striving to improve his condition. That the average Filipino likes to work is a much-mooted question. The experience here has established that where there is intelligence and some little school learning the native at once shrinks from mechanical trades, each desiring to be an 'escribiente' (writer).

"3. Recently the advisability of enlisting Filipinos in the service has been considered. For this reason, as well as the other above outlined, there would seem no better method to improve the condition of the Filipino and further the interests of the service, the Government, and country at the same time than by a development of the natives as far as possible in mechanical trades at this navy-yard. Under the present system in this department the Government suffers, and there is no chance of developing any new material. I allude to the fact that there has been only one white American mechanic in the shops where 488 men are employed.

"4. His supervision was of necessity most general, and the Government was continually losing money because of this condition. This one white foreman has been so occupied with his general superintendence and necessary office work that the development of any individuals because of contact with him is out of the question."

6. *Skilled labor.*—"1. For the Government's present interests financially and for the Government's future interests financially and otherwise, I recommend strongly that each shop of this department have at its head a good American mechanic. He would at once more than save his salary to the Government.

"2. I believe that the consequent possible development and education of the Filipinos in the mechanic trades should have fully as much weight as the immediate financial advantage to the Government. If the education of these people is determined upon, should it be restricted to school learning, which in many

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cases, where there is not enough strength of character, produces men who do not care to do manual labor? The discipline to which they are subject in a navy-yard is also, I think, not a small factor in their education.

"3. I am primarily speaking for the efficiency of the shops of which I have charge, and secondarily for the development of the natives into good, conscientious workmen, making good subjects.

"4. Outside of the immediate interests of this department, and in a general way the interest of these islands, which must have labor if the islands are to be developed, and some skilled labor at that, the immediate interests of the service demand just such a school as properly organized shops at the navy-yard would give for the education of these people in mechanical trades, if they are ever intended to enter the service.

"5. The dearth of skilled labor is bound to be felt more and more, and the Government, especially with its fixed rules for wages, is bound to feel the effects of it. With the development of the islands, skilled labor will be in demand, and this department has already lost some of its best men because outside civil establishments paid these men better wages than are authorized at this navy-yard. In stating this I do not desire to give the impression that navy-yard help is not so well paid as in outside firms, but rather that an outside firm, when an able man is much desired, will obtain him at any cost, being not tied down by a fixed schedule of pay. We should, therefore, aim to develop as many able men as possible so as not to feel the loss of a few.

"6. The question of skilled labor is especially worthy of consideration; yes, even urgent, because of the exclusion of Chinese. Some of the most able workmen in this yard have been Chinamen, but, as is evident from the law, there can be no further supply when these are exhausted.

"7. That white labor should be used here in any capacity other than that of supervision is out of the question. Something should be done, therefore, to effect the development of the Filipino skilled laborer. As stated above, I consider the appointment of a good American mechanic for each shop the best method. The need of skilled labor is especially felt in the machine shops because of the continual demand for this class of work.

"8. If their development is expected to be evolved out of themselves, I do not think the goal will ever be reached.

"9. When American help is employed, it should be borne in mind that the climate is a severe test, especially when a display of energy is expected, and on that account only young men should be appointed for this duty."

7. *Working hours.*—"1. Whether it is to the advantage of the work and efficiency of the department that there should be two schedules of time, one for Americans and the other for Filipinos, is questionable; in my mind it is not. If the natives are to be taught American methods, and especially are to be taught to work with the energy approaching that characteristic of the average American workman, the hours for the natives are too long.

"2. As the hours are fixed for the Americans they are considered amply long, especially in consideration of the climate. The idea that the natives are not subject to the climatic influences is, I think, a mistake, because from my observation I conclude that they do decidedly feel the effects of this extreme heat, and a large proportion are in poor health, the average Filipino being in physical strength and endurance far below the average American.

"3. If the hours for the natives were the same as those for American help, with the proper number of American employees, they would continually be under supervision, and would be receiving a thorough training, and would finally be deprived of the grievance arising from this discrimination in time schedule against them.

"4. If there has not been any protest it will surely come, and I consider it to the advantage of the department that this discrimination should be eradicated before an open protest is made."

8. *Attendance of employees.*—"1. The question of irregular attendance is one that has received much attention, but no satisfactory remedy has been found.

"2. There are three general causes for the large percentage of absences:

"First. The disposition of the average native to take things easy.

"Second. The great amount of sickness among them.

"Third. The frequent occurrence of holidays other than our national, which they will observe notwithstanding the urgency of any work on hand. These are the conditions which, if it is possible to change any of them, can be changed only most gradually."

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9. Generally speaking, I can state that I have not changed my views from those expressed in my report as quoted above, excepting, perhaps, that with the longer experience I have had, I am willing to modify them in the direction of putting a greater value on the possible development of the Filipino.

10. We are a people of an entirely different race, which makes it possible that in many cases of unfavorable judgment of them we may be as much at fault as they, as each views conditions from an entirely different standpoint, and a position which one believes as correct as the other.

11. These people, too, had been in subjugation for many years, while we have enjoyed all the advantages which freedom and generations of training and development have given us.

12. This department has already had an illustration of what advantage will accrue to the Government, as well as the Filipino, if the Government will only make an effort to instruct the best qualified of those anxious to learn.

13. I have reference to the fact that recently I have had two Americans in the shops of this department instead of only one. Although this has been a most meager increase, nevertheless, I see a decided improvement in the boys anxious to learn, because of the little individual attention they have had recently and which it was not at all possible to give them formerly.

14. With the older men it is difficult to introduce new methods, but that is a condition which I think holds true for all races and conditions of life, it always being a difficult matter to "teach an old dog new tricks."

15. Considering the primitiveness of the former methods under which these people have worked, and the not much more than primitive means which have been placed in the hands of this department, some of them have shown marked ability.

16. There are two conditions insurmountable for sometime to come which will subject these people to unfavorable criticism.

The first is that our languages differ, and this makes the transmission of ideas and instruction and the understanding of same difficult and at times impossible.

The second is that, be it because of their frugality in living and character of their food, or of the climate, or all of these, they are not equal physically to ourselves.

17. There are few of us whose mental and physical alertness and endurance are as great at the end of a tour of duty here as they were at the beginning of the duty. This is especially so when we have been held to continuous work without any relaxation.

18. With all these conditions against them we exact more of them in some ways than we do of ourselves, for we require of them more working hours each day than are required of any American employee.

19. Much has been said about their mendacity and general unreliability. Such characteristics are generally the result of bringing up, association, and conditions under which they have been living. If some of them have not a high regard for truth or for other people's property, such infractions are likely to occur anywhere when such a large body of men is employed as here.

20. In view of such existence as these people have had for many generations past, it seems only natural that they should not have the characteristics which we expect to find in a people who during the same period of time have had all the advantages which come with independence and close association with all that is most progressive.

21. In view of what was said in my annual report as to the general disposition to secure employment as "escribientes," I now desire to modify this to this extent.

22. There have been applications by boys, who have had good schooling and spoke some English, for appointments as apprentices. These could, however, not be made, as there were no vacancies, the number allowed being very limited.

23. When speaking in the report of the dearth of skilled labor, the demand outside for such labor was anticipated. This has been borne out by actual experience.

24. This department has only been able to retain such of the best Filipino mechanics as have ties here, these preferring to hold their position here in preference to one in Manila with better pay.

25. The ordinary laborers have had little chance in the past for development, as it has been impossible on account of the few Americans available for supervision to give them much attention.

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The greatest difficulty with them is that few of them speak even Spanish, which makes them difficult to handle.

26. Where in my report I speak of the reasons for many absences from work, I give as one reason: "The disposition of the average native to take things easy."

27. At that time I was not familiar with the fact that so many employees live at great distances in outlying towns, and are frequently absent on account of rains and bad roads, which, in a measure, may ameliorate this shortcoming.

28. If the progress desired in the development of the Filipino has fallen short of expectations, the experience in this department inclines me to ascribe it primarily to the lack of proper material in the way of tools and plant necessary to inaugurate modern methods, as well as to the altogether inadequate number of skilled Americans capable of teaching the natives new methods.

29. The proper American equipment, both in material and personnel, has been so wanting that it at once bars criticism of the Filipinos for not having made greater progress.

Very respectfully,

GUSTAVE KAEMMERLING,
Lieut. Commander, U. S. Navy, Head of Department Steam Engineering.

The COMMANDANT.

U. S. NAVAL STATION,
Cavite, P. I., November 18, 1903.

SIR: In answer to your letter dated November 16, 1903:

1. I have the honor to make the following report on the progress of Filipino labor during the year:

2. The skilled labor of this department is better than it was a year previous, and we are now doing better work than was done a year ago.

3. We have manufactured sights for several vessels for a reasonable price, and which have proved satisfactory in every detail. Also spare parts and accessories for rapid-fire and automatic guns. We have also manufactured revolver holsters and revolver cartridge boxes, canteens, and leather ammunition-passing boxes for the U. S. S. *Kentucky*. This kind of work was never done in this department until this year, and it turned out very satisfactory.

4. Attention is called to the differences in prices of great-gun targets (prize firing) that were made last year and those that were made this year. The cost of labor for making four great-gun targets (prize firing) last year amounted to $753.70 gold. This year we made eight similar targets—cost of labor, $346.89 gold. This does not include price of material. The reasons for the great difference of prices are: That we installed a bolt-threading machine and sewing machine, the latter for making the screens. Also the men were more familiar with their work and went about it more intelligently.

5. A model of 4-inch rapid-fire gun, one-fifth scale, was made in this department and sent to the St. Louis Exposition. The workmanship was very neat.

6. The carpenters are much better than they were a year ago, doing their work quicker and go about it more workmanlike.

7. The skilled laborers at the magazine are mostly men who have been promoted from common laborers, for being careful and intelligent in the performance of their duties. They have been engaged in such work as putting up 6-inch and 4.7-inch ammunition and breaking down, blending, and putting up minor caliber ammunition and handling and overhauling ammunition of all calibers, repairing and painting ammunition bosses and chests and re-forming cartridge cases.

8. The unskilled laborers in this department are good workmen and are improving; they are engaged in general magazine work, making shipments, loading and unloading cascos and lighters, and care and preservation of ordnance.

9. In my opinion the Filipino labor is much more satisfactory than it was a year ago and is improving.

Very respectfully,

J. T. SWIFT,
Gunner, U. S. Navy, Acting Inspector of Ordnance.

The COMMANDANT.

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U. S. NAVAL STATION,
Cavite, P. I., November 28, 1903.

SIR: 1. In compliance with instructions contained in your letter dated November 16, 1903, directing report on the progress made by Filipino mechanics and laborers during the past year, I have to report as follows:

2. It must be stated that, as a rule, the Filipino workman is indolent and indifferent to his own advancement beyond a very limited degree. This must largely be accounted for by the environment of the Filipino race for many generations past; the enervating effect of the climate, together with the few wants of the native, and the ease with which the necessities of life are obtained, cause him, as a rule, to be easily contented and careless as to improvement.

3. In the case of the older men little progress can be detected even where there has been constant supervision of American foremen, the older men reverting to their former methods when immediate supervision is removed.

4. The case of the younger men is somewhat more encouraging and a fair amount of improvement is to be noted, as they are quicker to see the advantages of improved methods of work, and it is believed that they are also more anxious for their own improvement.

5. I am strongly of the opinion that, if the Filipino is to be depended on for skilled labor in Government work at this yard, it will be necessary to maintain a well-organized force of competent American foremen for many years to come. The younger men will slowly but surely improve as they come in contact with improved methods and are compelled to use them daily. In this connection it is believed that the apprentice system, if largely extended so as to take in a much greater percentage of apprentices than now employed, will result in marked improvement in the force of mechanics.

6. The same remarks apply to unskilled as to skilled labor, as many of the younger men employed as helpers gradually learn the trades and make fairly good mechanics.

Very respectfully,

W. P. ROBERT,
Assistant Naval Constructor, U. S. Navy, Head of Department.

The COMMANDANT.

[From Report of the Philippine Commission, 1904, part 2, p. 42.]

MINING LABOR.

Although some of the natives of Lepanto and Benguet are accustomed to work in mines and like to do so, no large force of native miners has as yet been developed. The success obtained in using Filipino labor at the Mariveles quarries, on the Benguet road, and by the street railway company in Manila encourages the belief that there will be no great difficulty in securing a sufficient force of satisfactory miners as the mining industry develops. A Spanish mining superintendent is authority for the statement that he can at any time secure 60 good Visayan miners in the city of Cebu and begin the development of any coal mine in the island, and that with these men to instruct inexperienced laborers, he can in time develop a large force of coal miners. This man states that in mine timbering and other precautions for safety the Visayans have proved to be as good miners as could be desired. There is no reason for believing that the people of this tribe are likely to be better than the Ilocanos, Tagalogs, Bicols, or other civilized peoples of the islands. The collector of customs has rendered a decision to the effect that a miner is a skilled laborer, so that Japanese miners, and in fact any miners other than Chinese, may be imported under contract.

Unsettled conditions, due to brigandage and insurrection, are no longer such as to delay the development of mines in any province.

[From Census of the Philippine Islands, 1903, part 4, 427.]

IX. LABOR AND WAGES—CAUSES OF SCARCITY OF LABORERS—THE FILIPINO AS A LABORER—WAGE TABLES.

The difficulty of securing adequate and efficient labor for systematic industrial enterprises on a large scale has been frequently commented on by writers and others in discussing conditions in the Philippines. The scarcity of labor

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has always been assumed as a fact, admitting of no serious contradiction, and has generally been charged to the natural aversion of the average Filipino to all kinds of regular or sustained effort as a laborer, predisposed and accentuated by the climate and the richness and productiveness of the soil, by which his simple wants are easily supplied.

These causes have no doubt existed to some extent, and still exist; but other causes have also operated to prevent the development of industrious habits among the natives. The repression to which they were subjected by the Spaniards for more than three centuries; the commercial restrictions which prevented any extended development of industry beyond that specially fostered by the Government; the enforced labor with little or no compensation, amounting in many cases practically to slavery, which the natives were required to perform and which doubtless gave rise to or greatly strengthened the belief that manual labor was degrading; and the apparent impossibility of bettering economic conditions were no doubt baneful influences, calculated to create indifference, if not distaste, on the part of the Filipino for manual labor of any kind. But they have shown that they can overcome this indifference and have demonstrated, under intelligent supervision, in Manila at least, that they have natural aptitude and efficiency as workmen, not only in governmental employments, both civil and military, but in various branches of commercial and manufacturing industries carried on in that city. A large number of natives have been and are employed by the army and navy, and as a rule they do their work competently, regularly, and with little or no friction. And what has been accomplished there in the way of utilizing native labor can undoubtedly be accomplished throughout the islands generally if the same methods are applied.

A report made to Governor Taft, November 4, 1902, by J. B. Aleshire, major and quartermaster, United States Army, in charge of army transport service at Manila, clearly demonstrates the availability of native labor and strongly refutes the frequently expressed idea that such labor can not be profitably employed. His report shows that upward of 1,800 Filipino laborers, skilled and unskilled, were on the pay rolls of the Quartermaster's Department, a large proportion of whom were given regular and almost continuous employment. About 450 of the employees were engaged as launch and lighter officers and crews and were rated as unskilled, having been principally engaged in the handling of coal, freight, baggage, forage, etc.

The wages paid were as follows: Skilled laborers were classified and their rates of pay fixed according to the size of the launch to which they were assigned; the monthly wages in United States currency of patrones (masters) were from $20 to $50; engineers, $32.50 to $50; assistant engineers, $20 to $40; oilers, $15 to $20; foremen, $15 to $20; sailors, $10.

Unskilled laborers were classified as deck, river, and bay stevedores and bosses; laborers were paid 50 cents per day and the bosses $30 per month. During the year ending June 30, 1902, the number employed daily averaged 57 bosses and 906 stevedores.

Their hours of labor were from 7 a. m. to 12 m., and from 1.30 p. m. to 5.30 p. m., and under emergencies, whenever required, with no extra pay for Sunday or night work; under these conditions there was no difficulty in securing efficient labor. All Filipino employees were paid at the end of each month for the number of days' work performed during the month.

In concluding his report Major Aleshire says:

"Chinese labor was formerly employed for the handling of coal, but has been abandoned and replaced by Filipino labor, which, by practical tests during several months, averaged more tons per day per man and at a much lower rate per ton.

"The attendance of the Filipino laborer has been and is excellent. They do not absent themselves after Sundays, holidays, or fiestas, nor during such days should they be notified in advance they will be required to work. Their physical strength is much improved, and they are capable of doing as much and as hard work as any laborer we have in the Orient."

Testimony similar to the above is given in a report dated October 24, 1902, to the civil governor of the islands, by A. W. Butt, captain and quartermaster, United States Army, in charge of land transportation at Manila. The report states that during the month of September, 1902, an average month in the mat-

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ter of labor, 941 Filipinos were employed in the land transportation department, classified and paid, in United States currency, as follows:

	Per month.
Farriers	$30.00
Teamsters	20.00
Packers	18.00
Saddlers	17.00
Trimmers	14.00
Painters	14.00
Carpenters	14.00
	Per day.
Stevedores	0.50
Ordinary laborers	0.40

The employees received their wages monthly for the days actually worked. They were faithful, efficient workmen, careful and trustworthy, and, in occupations requiring the exercise of judgment and skill, rapidly developed superior ability. After proper training they performed as much and as good work as any other class of employees.

The Filipino labor employed in the ordnance department has not apparently proved as satisfactory as in the other two branches of service above referred to, concerning which reports have been made. J. H. Rice, lieutenant, Ordnance Department, U. S. Army, in charge of the Manila ordnance depot, in a report submitted to the civil governor on November 12, 1902, states that 191 workmen were employed at the department, classified and paid according to ability, in United States currency, as follows:

	Per day.
11 saddlers	$0.48 to $0.80
28 carpenters	.48 to 1.25
2 painters	.64 to .80
2 engineers	.50 to .80
27 armorers	.50 to 1.00
7 machinists	.50 to 1.00
4 blacksmiths	.50 to 1.00
4 tinners	.64 to .88
2 molders	.50 to 1.00
1 storehouse assistant	.80
6 storehouse assistants	.50
1 foreman of laborers	.80
95 laborers	.40
1 janitor	.48

The wages paid were monthly, eight hours constituted a day's work, and no difficulty was experienced in securing unskilled labor, but the report states:

"We have had much difficulty in securing skilled labor that we can use to advantage. In so far as possible, we endeavor to make skilled mechanics by teaching the unskilled, but the number with whom the effort is a success is small, as many seem either unable to advance beyond a low grade of work or do not care to make sufficient effort to obtain the increased pay.

"The efficiency of their labor is a matter of the standard chosen. As compared with the labor employed at arsenals in the United States it is not efficient. The cost of production is approximately the same, if anything a little higher here, and the greater part of our material is included at the cost price in the United States. The quality of the work is not so good, and there are considerable losses due to work that must be rejected. The men are not systematic, rapid, or trustworthy as laborers, and it seems nearly impossible to teach them these qualities. * * *

"There are not more than half a dozen natives employed who can be trusted to do alone and properly a piece of work with which they are familiar, and not one to whom it is safe to intrust anything having features new to him, however carefully he may be instructed. This does not mean that his work is always wrong, only that it is impossible to be sure that it will be right. Doubtless as a result of long training the necessity for really good work does not

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seem to be comprehensible to the majority of Filipinos at this depot, and if they make a mistake they seem to think it fully rectified by a patch, although several men have been discharged on this account. The time required to get anything done is a distinct disadvantage and can not be fully covered by an increased number of workmen, since the number that can be employed on any one job is limited."

It should be observed that labor of a much higher degree of skill and efficiency is required in the work of the ordnance department, Manila, than in either of the other branches of the service above referred to.

On this subject Maj. Gen. Arthur MacArthur, military governor of the Philippines, said in his annual report of 1900:

"Reiterated assertions to the effect that a native laborer in the Philippines is unreliable must be accepted as coming almost exclusively from Europeans who primarily are exploiters pure and simple, and as such have absolutely no interest in the islands beyond the immediate realization of enormous profits. Under the old system the wages of labor were too small to establish anything like a sense of self-interest on the part of employees, and as a consequence solicitude for the interests of employers did not exist, and workmen as a rule were indifferent as to their own constant employment and had little concern about the future, as their own wishes or interests were never consulted. American experience, so far as public employees are concerned, has not confirmed the declaration of the Europeans. On the contrary, it has been found that, when properly paid, the Filipino is precisely like any other man and holds on to a good place by reason of fidelity and faithful service."

Mr. H. L. Higgins, general manager and constructor of the Manila and Dagupan Railway, who had resided in Manila since 1887, stated to the Schurman committee, 1899, in regard to the labor used in building the railway:

"We tried the Chinese on one section, and they did not do good work. They would not work in water. The Indian will work in water better than a Chinaman. On a day wage the Indian will do as much work as a Chinaman in the same time. On piecework the Chinaman works like a slave, but put him on day work and he won't do anything. I like the native. I think he is a very good man in that position (referring to porters), but if you give them any administrative power they won't do. You can't put native inspectors on, and you can't have big gangs of natives under natives. You must have all your station men under an English inspector. You must have all of your drivers under an English foreman, and your shop must be under an English foreman. If you put them under a native foreman they go to pieces. They take advantage of it, and it generally ends up by swindling if they have any power. That is the great fault in the character of the native—they abuse their power."

Mr. Harold Ashton, of the firm of Holiday, Wise & Co., who had resided in the Philippines at that date for twenty-one years, stated, in speaking of their qualifications as laborers and mechanics, that they preferred light work, except lighterage. "That is very heavy work; so heavy that even the Chinese do not like it. * * * We have a gang of Filipinos which works in our godowns, and if it is a big job we have two gangs, when it is very stiff work, and we find that the Filipino gang does better than the Chinese coolies." In regard to their abilities as mechanics he said, "They made the only railroad that is here. The head of the railroad recently said to me, 'It is very surprising how they take to bridge making and the rest of it.'"

In an address delivered before the Union Reading College, at Manila, December 17, 1903, Governor Taft, in referring to the labor question, spoke as follows:

"With respect to the possibility of obtaining satisfactory labor from the Filipinos, I have only to say this, that experiments have shown that those who have gone about the matter systematically and have attempted to find out what the native needs to keep him constant in his attendance upon work have been successful, so that, wages considered, his work has been fairly satisfactory. But it is very certain that before satisfactory labor can be obtained from him he must be under the control of a master who understands him. I know the disposition of most Americans here is to open the doors and let in the Chinese, so that we may have Chinese cheap labor in the islands, but I am emphatically opposed to the general policy of admitting the Chinese; first, because the Filipinos have the strongest opinion that it will be for their detriment; and second, because I believe the history of the Straits Settlements shows that it will not be

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for their prosperity as distinguished from the material prosperity of the islands. I am opposed to admitting any Chinese labor until it shall be made to appear that the great works of construction which are essential in the islands can not be carried on satisfactorily with Filipino labor. This has not yet been shown, the young lions of the Manila press to the contrary notwithstanding. Of course we are all much affected by that which comes nearest to us, and when a newspaper proprietor or editor suffers from negligence, indifference, or ungrateful treatment by his compositors and pressmen, upon whom he is depending for getting out the paper, it is natural that he should feel indignant on the general labor problem. But if he will consult those of his fellows who have visited China and engaged in the newspaper business in that country, he will find that the life of an editor over there is not a happy one. It is to me very remarkable that the American papers have succeeded in obtaining among the Filipinos, knowing only Spanish or Tagálog, so many printers who can set up English; but whatever their failings and abilities, the whole labor problem does not turn on them. Strikes and unreasonable demands by printers are not unknown in the United States, and the soul of many an editor in the States has been seared with blasphemy, caused by what he regards as the shiftlessness and unreliability of printers. We have been successful in securing, and now have, more than 2,500 Filipino laborers at work on the Benguet road. The Atlantic, Gulf and Pacific Company has from 600 to 700 native laborers in their quarries, and Mr. Krusi of that company told me they were doing most satisfactory work. The quartermaster's department of the United States Army in Manila employs about 1,500 Filipinos; the city engineer's department of the city and the street-cleaning department of the city employ together probably an equal number, and they all report that the Filipino labor is good. Mr. Higgins, the manager of the Manila and Dagupan Railway Company, who built the original road with Filipino labor and is now building the branches authorized by the Commission, finds no difficulty with Filipino labor. Mr. Belden, of the street railway company, has had no difficulty in securing the laborers necessary, and they are now at work laying the ties. Captain Coudon, of the Cavite Navy-Yard, submits a favorable report upon his use of Filipino labor, skilled and unskilled.

"I venture to say that these citations, until others are shown indicating a different condition of affairs, are sufficient to sustain the fact that Filipino labor, when properly managed, can be made to do the work that this country requires, not so well as American or Chinese labor, but fairly well."

This is a conservative opinion by one who, as governor of the archipelago, visited all parts of it, and to whom all sources of information were open. There is no doubt but that the Filipino laborer has much to contend with, more especially in the provinces, but as the field of his usefulness widens and he realizes that he is something more than a mere drudge, and with examples of American industry to weaken his prejudice against manual labor as undignified and unmanly, and to excite his pride and steady his application, and with just treatment and fair wages, it is not unreasonable to assume that the Filipino of the provinces can and will become as good a workman as he has proved to be in Manila or as the Tropics can produce and by his labor add greatly to the material prosperity of his country.

The rates of wages which have prevailed since American occupation, while low, as compared with wages in the United States, have been substantially double those paid under Spanish dominion. In Manila the wages of workmen employed by military authorities were usually fixed in United States currency, but in practically all other cases they were in the currency of the country—the Mexican dollar, or peso.

The census supervisors in the organized provinces reported the average wages paid certain occupations prior to 1898 and in 1902 in local (Mexican) currency, which are presented in the two following tables.

These meager tables of wages show very clearly the limited number of wage-earning occupations in which Filipinos were engaged throughout the provinces, both prior to and at the date of the census. In Manila there was a much larger number of occupations, but the Chinaman, with his gainful instincts, his indifference to his surroundings, his persistence and greater skill, has always been largely in evidence in Manila, and ready to compete successfully with the Filipinos in nearly all the trades, and thus drive them to occupations of a much lower and much less profitable kind.

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Average wages paid Filipino workmen in Manila prior to 1898 and in 1902, in local (Mexican) currency, by the day and by the month, in the occupations specified.

Occupation.	Average wages paid prior to 1898 (pesos).		Average wages paid in 1902 (pesos).	
	Per day.	Per month.	Per day.	Per month.
Accountants		30.00		80.00
Bakers		15.00		25.00
Bakery foremen		20.00		35.00
Bamboo and rattan furniture makers	0.75		2.00	
Band musicians	2.50		5.00	
Barbers		20.00		30.00
Barbershop foremen		20.00		30.00
Blacksmiths	1.50		3.00	
Blacksmiths, foremen	2.00		4.00	
Boat builders	1.00		2.00	
Boat builders, foremen	2.00		4.00	
Boatmen	.50		1.50	
Bookbinders	.25		1.00	
Bookbindery foremen	1.00		2.00	
Brickmakers	.37		1.00	
Brickmakers, foremen	1.00		2.00	
Brick masons	.62		1.00	
Brick masons, foremen	1.00		2.00	
Butchers	1.00		3.00	
Cabinetmakers	2.00		4.00	
Cabinetmakers, foremen	2.00		5.00	
Candle makers	.75		1.50	
Candle makers, foremen	1.50		4.00	
Carpenter	.62		1.50	
Carpenters, foremen	1.00		2.50	
Carriage blacksmiths	2.00		4.00	
Carriage carpenters	1.25		2.50	
Carriage factory foremen	2.00		3.50	
Carriage leather workers	.75		2.00	
Carriage painters	1.00		2.50	
Carriage wheelwrights	1.00		1.75	
Cart builders	.75		1.50	
Cart builders, foremen	2.00		3.50	
Cart wheelwrights	.75		1.50	
Chocolate makers		15.00		35.00
Chocolate makers, foremen		25.00		45.00
Cigar-box factory foremen	.75		2.00	
Cigar-box fillers	.80		2.00	
Cigar-box makers	.50		1.50	
Cigar-factory foremen		35.00		80.00
Cigar sorters	.80		2.00	
Cigarette packers	.50		1.00	
Cigarette makers	.40		1.37	
Cigar makers	.80		2.00	
Clerks		25.00		45.00
Coachmen		15.00		30.00
Compositors in printing establishments		15.00		40.00
Confectionery makers		15.00		25.00
Confectionery makers, foremen		30.00		50.00
Cooks		15.00		30.00
Day laborers	.37		.80	
Distillery foremen	.75		2.00	
Distillery workmen	.75		1.50	
Draftsmen	2.00		4.00	
Dressmakers		200.00		200.00
Fishermen	2.00		3.00	
Hand sawyers	.75		1.50	
Harness makers	.62		2.00	
Harness makers, foremen	1.50		3.00	
Hat makers	.40		.80	
Hatmakers, foremen	.75		1.50	
Horseshoers	.50		1.00	
Horseshoers, foremen		30.00		45.00
House and sign painters	.80		1.50	
House and sign painters, foremen	1.00		3.00	
House servants		10.00		15.00
Iron-foundry foremen		125.00		250.00
Iron ladlers	.75		2.00	
Iron molders	1.50		3.50	
Iron polishers	2.50		3.50	
Laundry foremen	.40		.80	
Laundrymen	.20		.50	
Lithographers	.40		1.00	
Lithographers, foremen	1.25		2.50	

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Average wages paid Filipino workmen in Manila prior to 1898 and in 1902, in local (Mexican) currency, by the day and by the month, in the occupations specified—Continued.

Occupation.	Average wages paid prior to 1898 (pesos).		Average wages paid in 1902 (pesos).	
	Per day.	Per month.	Per day.	Per month.
Machinists	.40		1.00	
Machinists, foremen	1.00		2.50	
Pottery makers	.37		1.00	
Pottery makers, foremen	.37		1.00	
Printing-office foremen		45.00		120.00
Rope makers	.75		2.00	
Saddlers	.75		2.00	
Saddlers, foremen	.75		2.00	
Sailors		12.00		24.00
Salesmen	.60		2.00	
Seamstresses	.20		.40	
Shirt makers	.50		1.00	
Shirt makers, foremen	1.00		2.00	
Shoemakers	.75		2.00	
Shoemakers, foremen	.75		2.00	
Silversmiths	.75		1.25	
Silversmiths, foremen	1.25		2.25	
Soapmakers	.75		1.50	
Soapmakers, foremen	.75		1.50	
Spinners	.50		1.50	
Stationary engineers		60.00		125.00
Stationary firemen		12.00		28.00
Steam sawmill foremen		25.00		40.00
Steam sawyers	1.00		2.00	
Steamboat engineers		80.00		150.00
Steamboat firemen		12.00		28.00
Stonecutters	.62		1.00	
Stonecutters, foremen	1.00		2.00	
Stone masons	.62		1.00	
Stone masons, foremen	1.00		2.00	
Tailors	.75		2.00	
Tailors, foremen		30.00		80.00
Teachers		25.00		120.00
Tinsmiths	.60		1.00	
Tinsmiths, foremen	1.00		3.00	
Trunk makers	.50		1.00	
Trunk makers, foremen	2.00		3.00	
Umbrella makers	.50		1.50	
Umbrella makers, foremen	1.00		2.00	
Watch repairers	.75		2.00	
Weavers	.50		1.50	
Wood sawyers	.75		1.50	

Inquiry was made, through schedule No. 5, relating to "social statistics," as to the wages paid in a few occupations, to wit: Farm laborers, ordinary laborers, carpenters, masons, painters, and blacksmiths. The information secured upon this subject is presented in the following table, which shows the average wages paid employees in the occupations specified, at the time of taking the census in 1903, in the different provinces. It should be stated, as to farm laborers, that while the table shows the average money compensation paid them per day, the usual custom throughout the islands is to pay them with a share of the products of their labor; the payment of wages in money to this class of employees is exceptional.

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Average daily wages paid in specified occupations, by provinces and comandancias in 1903.

Province or comandancia.	Average wages per day, in pesos, of—					
	Farm laborers.	Ordinary laborers.	Carpenters.	Masons.	Painters.	Blacksmiths.
Philippine Islands	0.55	0.51	0.90	[b] 0.89	1.06	1.11
Abra	.30	.24	.44	.52	.40	.50
Albay	1.01	.89	1.41	1.49	1.88	2.19
Ambos Camarines	.82	.57	1.11	1.10	1.38	1.45
Antique	.52	.30	.51	.42	.71	
Basilan [a]	.63	.50	.69			.50
Bataan	.71	.54	1.04	.99	1.01	2.00
Batangas	.42	.42	.70	.79	.94	.92
Benguet	.20	.70	.54			.50
Bohol	.59	.49	.83	.54	.99	.94
Bulacan	.73	.62	1.01	.99	1.23	1.12
Cagayan	.71	.60	.86	.49	.99	1.04
Capiz	.33	.26	.49	.52	.67	.83
Cavite	.67	.79	1.23	1.20	1.45	1.35
Cebu	.42	.32	.60	.56	.79	.95
Cottabato [a]	.51	.50	.95	.98	[c] 1.00	.83
Dapitan [a]	.50	.48	.94	.75		
Davao [a]	.26	.25	.68	1.00		.75
Ilocos Norte	.43	.33	.51	.63	.74	.71
Ilocos Sur	.46	.35	.67	.59	.84	.79
Iloilo	.44	.31	.58	.70	.82	.92
Isabela	.96	.72	.91	1.25	1.21	1.10
Jolo [a]	.40	.40	1.50	1.50	1.50	1.50
La Laguna	1.02	.93	1.36	1.31	1.47	1.45
La Union	.72	.50	.80	.91	.97	.99
Lepanto-Bontoc	.23	.21	.43	.50		.75
Leyte	.70	.86	1.45	1.33	1.64	1.72
Manila City	1.00	.80	2.00	1.50	2.00	2.50
Marinduque [b]	.60	.49	.93	1.75	1.05	1.75
Masbate	.54	.65	1.06	1.25	2.00	1.10
Mindoro	.37	.35	.55	.58	.63	.75
Misamis	.58	.66	.97	.74	.81	1.15
Negros Occidental	.33	.37	.54	.67	.91	1.05
Negros Oriental	.33	.34	.65	.63	.63	1.00
Nueva Ecija	.43	.40	.70	.63	.83	.99
Nueva Vizcaya	.33	.33	.58	.75	.58	.75
Pampanga	.78	.43	.65	.78	1.01	.75
Pangasinan	.53	.45	.76	.71	.79	.76
Paragua	.25	.26	.33	.28	.25	.38
Paragua Sur [a]	.31	.50	1.00	.75	1.00	1.00
Rizal	1.09	.79	1.33	1.35	1.28	1.41
Romblon	.43	.55	.73	.68	.83	1.17
Samar	.67	.87	1.21	1.04	1.38	1.00
Siassi [a]	.25	.25	2.00			
Sorsogon	.88	.99	1.40	1.36	1.50	1.73
Surigao	.45	.35	.97	1.00	1.10	1.01
Tarlac	.55	.52	.82	.81	.94	1.00
Tayabas [a]	.71	.66	1.17	1.21	1.71	1.62
Zambales	.36	.37	.59	.62	.75	.86
Zamboanga [a]	.52	.52	.78	.80	.81	.94

[a] Comandancia. [b] Subprovince of Tayabas. [c] Exclusive of subprovince, Marinduque.

[From Senate Document No. 277, Fifty-ninth Congress, first session, hearings before the Committee on the Philippines of the United States, p. 457.]

COMMITTEE ON THE PHILIPPINES,
UNITED STATES SENATE,
Washington, D. C., February 5, 1906.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

Secretary TAFT. * * * In the first place, we have had a great deal of talk here about Chinese labor. There is absolutely no Chinese labor engaged either in sugar or tobacco, on the farm or in the factory. I say that without hesitation. There are some nineteen Chinese factories, I believe, for tobacco manufactures in Manila, but there are no Chinese workmen in those factories. Now,

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as illustrating the danger of statistics, before you have a census, and before you have made an investigation, I went before the Foreign Affairs Committee, having been called there by Mr. Hitt, and was interrogated as to the number of Chinamen in the islands.

The labor unions were very much troubled about the presence in those islands of Chinamen, whose presence there they regarded as a threat, and one gentleman, representing the union, stated that there were a million and a half Chinamen in the islands, and I was asked as to that. Well, I did not know. I had to guess as to that, as I did on every other subject of a statistical character with respect to the islands at that time. That was at the same time that I appeared before the committee here for thirty days. I ventured the statement that there certainly were not more than 300,000 Chinamen in the islands. I said that the board of health census showed that there were not more than 60,000 in Manila, and certainly I thought I could guarantee that they did not exceed 200,000. Well, what does the census show? It shows that there are about 27,000 in Manila, and that there are not more than 50,000 in the entire archipelago. Not only that, but it shows that in the agricultural labor in the islands there is not more than 2½ per cent of other than Filipino labor.

Mr. WELBORN. Two-tenths of 1 per cent.

Secretary TAFT. Two-tenths of 1 per cent other than Filipino labor. The Chinaman is a merchant. He goes to the islands and works on the wharves in Manila at $14 silver a month, and he saves out of that about $17 or $18 a month, and at the end of a year he has a capital which enbles him to set up a business, and he puts his store right down next to a Filipino woman, for the women do the storekeeping in the Philippines, and he drives that woman out of business in six months. That is what explains the very great hostility to the Chinamen in the Philippines and what also explains that there is not the slightest danger from Chinese labor in those islands.

You introduce the Chinamen into those islands, and you will have a revolution on your hands in a minute. The political reason, if there were no other, is an absolute bar to the admission of Chimamen under any other restrictions than those contained in the present very radical and stringent exclusion law. The truth is that the Chinaman is adapted to labor in the fields, where that labor involves great patience, attention, and deftness. He is a truck gardener by nature, and truck gardening, because it requires patience, attention, industry, and constant watchfulness, is a very profitable business if you get that kind of a man to work it. So there are a few Chinamen engaged in truck gardening in and about the profitable market of Manila, but there is not, I could almost say, another Chinaman engaged in agriculture in the Philippine Islands.

Now, the Japanese labor which comes to the islands we have to pay a dollar a day for in gold. That is what is paid by Mr. Welborn on his agricultural place in Benguet, where he has a test farm; that is what is paid in the mines in Batan, where the Government has been experimenting with respect to mining; and that is what is paid by the hemp people, who attempted to import Japanese into the hemp fields, or rather into the hemp-pulling industry. The minute that you increase the demand for that kind of labor you increase the price, and, therefore, what fear is there of Japanese labor at a dollar in gold to-day in the Philippine Islands?

Senator BEVERIDGE. May I ask, Mr. Secretary, why do you employ this Japanese labor on the test farm at a dollar a day instead of the native Filipino labor? Is it because the native Filipino labor is not equal to the task?

Secretary TAFT. I want to say with respect to the Filipino laborer that he is a laborer who needs instruction. I have great hope that the Filipino laborer will become much more effective than he is to-day, and I have that hope from the experience that the Government has had with him, from the experience that has been had with him in the construction of the Manila port works, and from the experience that the street-railway company had with him in constructing the street railroad in Manila.

Senator BEVERIDGE. At present he would not be considered an efficient laborer?

Secretary TAFT. Oh, no, sir; I do not think so.

Senator BEVERIDGE. He would not be a competitor with the labor of the Japanese or Chinamen, and much less with that of the Americans?

Secretary TAFT. That is true. Where you get them in large bodies, as in Manila—for they usually come to the city—you can get even now, with American foremen to supervise them, you can get an instruction of the labor, and finally they make what, for tropical laborers, are efficient men, but that has to

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be done by building a village for them, and putting in a church, and putting in a cockpit, and putting in bands who play every night, and putting in schools and making them comfortable, and treating them as you ought to treat them; but the minute that an American calls on them, I do not care where it is, to labor, just that minute their demand is for higher wages.

Senator BEVERIDGE. In addition to all that, is it not true that this labor that you speak of, flocking to the centers, like Manila, is really the picked labor of the islands so far as intelligence is concerned?

Secretary TAFT. It is certainly the most enterprising, and presumably the better class.

Senator BEVERIDGE. And therefore much superior to the common labor out through the country?

Secretary TAFT. Yes, sir. Now the question as to the cost of labor in the islands is a question that it is absolutely impossible to answer with certainty. There has been in the islands for a great many years—in all parts of the islands, and its effect continues—a certain sort of peonage. The peonage was of this character: A man had a plantation and gathered about him a number of servants, men who worked for him; they had families, and he furnished them shacks in which to live. Then he furnished them food and such clothing as they needed, and he kept an account against them in such a way that they all grew into his debt. Then the children came on and they were compelled to recognize the debts of the fathers, and that indefinable, possibly, but certainly indissoluble bond, continued. On that plantation a man has a sugar plantation, for instance; the man has a great many dependents of that sort. The land has come down to him; his father owned the plantation before him, and his grandfather before him.

Now with respect to those servants, it is absolutely impossible for him or them to tell what their wages are. If you have a benevolent man at the head of them, he treats them generously, and if you do not he does not. But they are in such a situation of dependence that they are absolutely under his control. That system was favored in Spain. There was nothing in the Spanish régime that was aimed to give to those people an interest in their own rights and a kind of independence of the planter. Now that we have come in there is a changed feeling among that class, and although it is difficult to teach them what their rights are, there is a growing independence of their former masters. But that labor which the planter has on his plantation is by no means enough to carry on his agricultural operations during the year. He has to go out and get other labor, and so in Negros he has to go to Antique and Capiz and down to Bohol and into Cebu to get laborers, and when they come he has to pay the expense of their transportation, and he has to pay a higher wage. The minute that an American appears on the ground for the purpose of carrying on sugar plantations that minute the wages go up, and the larger the number wanted the higher they will go.

It is absolutely absurd to say that the labor market in Manila is not more sensitive than the labor market in the United States. As ignorant as those people are, they take in a fact affecting such a thing as the price of labor easily, and it spreads like wildfire by whispering from one to another. I have seen a letter from Mr. Wheeler, whom I know—he is the head of the company that is engaged in lumbering in the north of Occidental Negros—in which he tells about the increase of wages with him, because he asked for 200 laborers. It was at first 25 cents gold a day, and now it has gone up to 37½ cents a day, and he has to give them shacks to live in, and has to transport their rice from Manila, and he has also to give them other privileges. Besides, he gets part of the labor in Panay and transports it free to his place. Therefore to say that the labor in the Philippines is 6 cents or 10 cents or 15 cents a day, and to calculate on that what the cost of sugar is, or will be in the future, is utterly absurd.

Senator BEVERIDGE. At that point, Mr. Secretary, I would like to interrupt you to ask you two or three questions. The attempt has been made in these hearings to show that the American laborer engaged in the production of beet sugar and other similar things is in danger of free competition with the Filipino laborer. It has been shown here, as we all know, that the American farmer works from twelve to fourteen hours a day. How many hours does the ordinary laborer in the Philippines work?

Secretary TAFT. Well, it is a little difficult to answer that. You get the impression——

Senator BEVERIDGE. Does he work in the midday at all?

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Secretary TAFT. You get the impression as you go through the country that he does not work at all, because ordinarily, when you reach a town at 10, 11, or 12 o'clock, you see him sitting up in the front window with his wife, and they are both smoking, and the children are playing about them, and you think he is not in the fields at all. As a matter of fact, they rise very early in the Philippines. Ordinarily they get out at daylight in the morning, and they do their work from then until 8 or 9, and in the afternoon they return again, in some cases, say 3 or 4 o'clock in the afternoon, and then they return and work until dark.

Senator BEVERIDGE. That is to say, they work about eight hours, then—from 4 to 9 in the morning, which is at most five hours——

Secretary TAFT. Unless they are under training they do not work any more than they have to. That is entirely true.

Senator BEVERIDGE. I want to get the basis of comparison with this supposed menace to the American labor in competition with the Philippine labor. If they work at all, they would work from about 4 in the morning—that is, about daylight, up to about 8 or 9 o'clock, and then in the afternoon from the time it becomes suitable to be out of doors, until dark again. So, all told, they would work, if under strict discipline, about eight hours a day?

Secretary TAFT. No; I think they could be trained to work right through the middle of the day.

Senator BEGERIDGE. Do they work through the middle of the day?

Secretary TAFT. That depends on what they are working for.

Senator LONG. And upon their industry?

Secretary TAFT. Yes, sir.

Senator BEVERIDGE. What I am asking for is the comparative number of hours that they work now with reference to the number of hours which we all know the American farmer works.

Secretary TAFT. Well, under normal conditions, where they are under the influence of a man who treats them as they ought to be treated and understands their nature, I would not say that they did not work as long as an American farmer. My impression is they must have—or all of them do have, and a man who would prevent them from doing it would make a fool of himself—they must have a siesta in the middle of the day. But that is a ceremony that takes very little time in preparation for it, for they can sleep on the edge of a board with a brick for a pillow and enjoy it quite as much as we enjoy it under a heavy covering on a cold night.

Senator BEVERIDGE. I wish to inquire, on that point, as to the productive quality of their labor as compared with that of the American farmer.

Secretary TAFT. That can be very greatly improved, and of course it is not difficult. Generally it is much dearer per unit of work product than in America, although not in all cases.

[From hearings before the Committee on Ways and Means, House of Representatives, January 23–28, and February 3, 1905, p. 195.]

COMMITTEE ON WAYS AND MEANS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., January 28, 1905.

STATEMENT OF HON. WILLIAM H. TAFT, SECRETARY OF WAR.

Secretary TAFT. A recommendation was made three years ago by the Commission with respect to getting in Chinese skilled labor. That recommendation arose from a desire on the part of the Commission to encourage the construction of ships in Manila Harbor, and the skilled shipwrights were not sufficient in number among the Filipinos to justify the investment of capital by Americans and some foreigners in two or three shipyards in Manila. Therefore we made that recommendation. As a matter of fact, the Commission as a whole is utterly opposed to the introduction of Chinese labor into these islands at all, and so am I, as an individual. The measure that was proposed would have been not at all harmful, because the Chinamen would have to come in under a bond, and the skilled laborers were to be returned to China at the end of five years. It was for the purpose of beginning the industry and teaching the Filipino apprentices a trade. But Congress did not see fit to give us the opportunity.

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Now, as happens if one waits, the remedy has been found, and Filipinos are increasing in the skilled arts. They are very skillful with their hands, and what with industrial schools and the Chinamen we already have in the islands, we are gradually getting carpenters and other skilled mechanics from among the Filipinos.

The whole policy of the administration and the Commission is against the introduction of Chinese labor into those islands; but not because of the fear, as in the case of these gentlemen, that coolies would go onto the sugar plantations. The truth is that you could not drive a Chinaman onto a sugar plantation in the Philippine Islands.

You can not get a Chinaman into a tobacco plantation. The minute that he lands he becomes a porter or a shopkeeper. If he has not a little capital so that he can set up a shop, unless he be a skilled laborer—in which case he goes to making houses, or something of that sort—he earns 10 or 15 pesos a month, and out of that 10 or 15 pesos he seems to save about 20 pesos a month, and at the end of a year he sets up a store next door to the store of a Filipino woman, and at the end of a year he drives her out of business. Now, I have heard, since I have had the honor of appearing before Congressional committees year after year, the statement with respect to the number of Chinamen in the Philippine Islands, diminish and diminish and diminish.

Before the Foreign Affairs Committee, of which Mr. Hitt was chairman, some gentlemen of the labor unions appeared and testified in favor of the extension of the Chinese exclusion act over the Philippines, and also in favor of its being applied in this country against the Philippines, because there were one and a half millions of Chinamen on these islands, and therefore to let in immigration from those islands would involve a transfer of Chinese into this country. It has been said here that there are 60,000 Chinamen in the city of Manila. That has been stated to this committee. I supposed at one time there were that many. I supposed that the number of Chinamen in the Philippine Islands would perhaps reach 150,000 or 200,000.

As a matter of fact, the census shows that the number of Chinamen in the city of Manila is 25,000, and I doubt if the entire number of Chinamen in the entire archipelago is more than 75,000; and there is not a Chinaman out of that 75,000, not a single one, who would work in a sugar or tobacco field or in a cocoanut field or in any agricultural pursuit, except possibly in the cultivation of a few truck gardens in the vicinity of Manila. In Borneo they have attempted to give land for the cultivation of sugar and tobacco to any Chinamen who would come there and take it. They have sent agents to invite them to come down there and go into the fields. They can not get them into the fields.

General Davis was told by the governor of Borneo that every effort had been made to get the Chinaman into the fields of Borneo, and that it was impossible to get him there. He knows a better thing. He knows that he can make more by going into trade, and can live better if he lives as a porter or a shopkeeper. So that this fright of cooly labor is another of the chimeras. First, there are only 75,000 Chinamen in the islands; and secondly, not one of them can be induced to work in a tobacco or sugar field; and thirdly, we do not intend to let a Chinaman in there. The reason is not because of the competition of labor. That is not the reason the Filipino people are down on them. They do not fear competition of labor. What they fear is the competition in business, and they look to the example and the illustration of the danger in the Straits Settlements. When the English went there they let the Chinamen in. There are now more Chinamen than Malays in the Straits Settlements, and they own the Straits Settlements. They do not own the mines, because the Government owns those and charges a royalty, but they do all the business, and the Malay is relegated to an inferior and altogther negligible condition.

Now, it seems to us that it would be the grossest breach of a trust were we to open those islands to the settlement of Chinamen and drive the Filipinos to the wall in their own country. I do not mean to say that if we were to open the islands to the Chinaman the islands would not be developed much more rapidly than now, but under the development now it will be the development of the islands for the Filipino and not for the Chinaman. So that that fear of cooly labor is altogether unfounded.

Mr. WILLIAMS. With regard to the measure before us, there is nothing about the introduction of Chinese at all?

Secretary TAFT. No, sir.

Mr. WILLIAMS. Nothing of that sort is now asked or thought of?

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Secretary TAFT. No, sir; the recommendation as to the importation of a few Chinese skilled laborers was contained in the report of the Commission three years ago, and nothing has been requested since.

I may say this, as illustrating the condition of labor: There was a 60,000-acre tract of land belonging to the Augustinians which we bought in the friars' purchases, and I was making inquiries of the manager of the Tabacalera Company, which is the largest company in the archipelago, as to what that hacienda was worth. It lay just in the neighborhood of a hacienda of the Tabacalera Company. He said that if the Commission would let him introduce Chinese labor to build his houses and factory and equipment and take the labor onto that hacienda he would give me a very handsome price for it, but with the condition of labor, and especially the condition of labor in Isabela and Cagayan, he would not give anything for it. He was also under a wrong impression as to the use he could put Chinese in the agricultural field. Of course his statement was an exaggeration, but it illustrates the labor conditions in the islands. They have to import, as I say, into Negros half of their labor each year for six months.

Mr. WILLIAMS. Now, on the cost of labor in the Philippines; have wages been increasing every year since the American occupation, or not?

Secretary TAFT. Yes, sir.

Mr. WILLIAMS. How are they as compared with what they were when you first went there?

Secretary TAFT. We went about the islands, into every province of the 40 in the islands, in 1901, and wages had doubled over those in Spanish times in every province into which we went during that trip. Since that time, in some provinces where they have had practically a famine, wages have fallen off; but wherever there have been normal conditions wages have crept up, for the reason that there has been so much greater demand. In Manila the army quartermaster has 3,000 men; then there is a street railway being constructed in Manila, and that has raised the price of labor in Manila, I think, probably 25 per cent, perhaps more than that, and then there is the work on the Manila Harbor.

Of course this does not affect labor in all the islands, but the local rise due to it is illustrative of the kind of effect that will come with the introduction of railroads and with the development of the country as we go on. And this argument of our opponents, as I understand it, Mr. Williams, assumes a marvelous development of the country with respect to the sugar production. Of course if that development is to come, it will be accompanied by a development in the hemp industry and a development in other ways, and the limitation, therefore, that the price of labor will necessarily have on the production is a serious and actual one.

Mr. WILLIAMS. And it will become more serious each year.

Secretary TAFT. Yes, sir.

Mr. WILLIAMS. Has the supply of sugar and the number of people engaged in sugar production increased?

Secretary TAFT. Yes, sir; in the last year from 83,000 tons to 140,000 this year; but in 1893 it was 240,000 tons, so that it fell off for some years. You have been advised already of the very high prices that have to be paid for hemp laborers, going up, as I have already said, to 4 or 5 or 6 pesos a day. And we are advised of that, too, in trying to get men to work for the public in various provinces. In some places it is impossible to get them to work on the roads, because of the high price to be paid for labor.

* * * * * * *

There is one subject that I touched upon this morning, about which I would like to be permitted to say a word or two more; that is the general subject of labor.

Labor in the Philippine Islands has the characteristics of labor in nearly all the Tropics. The laborer in the Tropics ordinarily is not what would be called industrious to the extent that laborers are in the Temperate Zone. There are some exceptions to this. The laborer in Java, by reason of the compulsory form of labor which has long prevailed there and by reason, too, of the necessity that he is under of raising food enough for 28,000,000 of people in a small island like Java, is an industrious laborer; but that is not true of the Philippine laborer. On the other hand, he is capable of instruction; he does better work for better wages.

The first result of giving him better wages is to have him work less days a week. He is something of a philosopher, and at first if he can earn enough in

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two days in a week to last him a whole week he works only two days and remains idle the other four. As he comes to learn that now he may keep what he saves and as things he regarded as luxuries come to be regarded by him under the American régime as necessities he is furnished a motive for labor. No man labors for the fun of it; he works for the purpose of getting that which he wishes to live on. Now, the Philippine laborer has been condemned in extreme terms for laziness by many of the foreigners and by the Americans who have been used to American standards of labor. In order to meet these extreme, erroneous, and unjust statements the Commission and the members of it at various times have made reports on the subject.

The Philippine laborers, when aggregated in gangs under white foremen and superintendents, can be trained to do fairly good work. It was supposed that they could not be used for railroad work or road work or quarry work. But experience in Manila and in the large works of construction about Manila justifies the belief that they can be trained to better work than they have been heretofore in the habit of doing. The quarry which is supplying stone for the construction of the great harbor works in Manila is now mined by Filipino labor. When they first came there the contractors attempted to use Chinese labor, but they found the Chinese laborer was not satisfactory. It was expensive, because under the Chinese exclusion laws the Chinamen lawfully there were disposed to ask for higher wages and for greater privileges, because the Chinaman readily finds out his value in the market and what facts are with respect to that which he has to sell.

Finally Mr. Krusi, the vice-president of the company, concluded to make an experiment. He erected a number of inexpensive houses, put up near the quarry a church, a theater, a cockpit; he hired a band, he had schoolhouses and school-teachers, and he established a little community. And then he invited the Filipino laborers to come in there with their families; and for two or three years he has conducted a labor colony there from which he has drawn a thousand laborers, who have continued to work and have been to him, for tropical labor, quite satisfactory. So, too, in the custom-house it has been found by the collector of customs that Filipino laborers can be trained to be fairly satisfactory workmen. I ought to say that Krusi employs in his quarry about 8 per cent of white labor—that is, 8 per cent of foremen. It is found that unless a foreman is willing to get down and work himself from time to time, to show his men how to work, he does not serve the purpose; but with that the Filipino laborer can be made fairly satisfactory. So, on the Benguet road, which is a work of great construction that we have been undertaking, we have had some 3,000 Filipino laborers and about a thousand Japanese; and we have also tried for awhile 500 or a thousand Chinamen. The Chinamen used opium to such an extent and were so difficult to manage that we got rid of them, and the road is now being constructed by Filipinos and Japanese.

Mr. WATSON. Is that a macadamized road?

Secretary TAFT. Yes; but it involves the cutting down of cliffs. It is built along a canyon, and it is a road that runs from the lowlands to the height of 6,000 feet up the Bued River canyon, and it involves the removal of some very high cliffs of stone, which is of a shaly character; so in order to prevent sliding the inclination of the slope must be made gradual, and the cutting has to be very extensive and large. They have to cut up and back two or three hundred feet in order to get a proper slope. I ought to say that the street railway company has been able to build and lay its tracks in the city of Manila, as I am informed, at a rate that is perhaps 33 per cent less than the price of laying track in an American city would be. So the Filipino laborer thus organized and under American foremen has something of a future.

On the other hand, labor of this sort in agriculture is a labor which the communities have always been used to. They are an agricultural people. But they are also a people given much to amusement, and they have about sixty fiesta days in every year in addition to the regular Sundays. They are not constant in their attendance at work. They will come Tuesday instead of Monday, and sometimes Wednesday instead of Tuesday. Nevertheless, I think the truth lies between the statement which assumes that they are equal to the Temperate Zone laborers on the one hand and to that condemnatory statement that says that they are worth nothing on the other. But the limitations upon labor—I mean the limitations which the short supply of labor necessarily puts upon the production of sugar, which requires a great deal of labor, or any other crop needing labor—are obstacles to a tremendous expansion of any of the products of the islands, and especially to sugar and tobacco.

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[From Engineering News, Nov. 23, 1905.]

LABOR CONDITIONS IN THE PHILIPPINE ISLANDS.

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This paper is presented for the purpose of showing briefly some of the essential conditions surrounding the labor problem in the Philippines, a knowledge of which would be of value to the engineer or contractor contemplating public works in those islands. The subject is particularly appropriate in view of the harbor improvements now in progress at Manila, Cebu, and Iloilo, which will together involve an expenditure of about $5,000,000; the new sewer and water systems, and the railroad projects, involving an estimated cost of about $4,000,000 and $30,000,000, respectively, both of which are now under advertisement; and other more or less extended and much-needed public improvements which must be prosecuted in the near future.

That portion of the paper relating to the characteristics of the Filipino is written with special reference to that class of the Filipino people from which are drawn the unskilled laborers, without whose assistance the development of agriculture and the prosecution of public improvements would be impossible. It is to be noted that it is that class with which the American people are especially concerned in their repeated enunciation of the governmental policy of the "Philippines for the Filipinos," a "square deal," and "equal rights for all."

* * * * * * *

There are in the Philippines two main classes of people—the gente ilustrado, or the higher class, and the gente baja, tao, or the lower class. The middle class, that predominating and important class in the affairs of the United States, is practically lacking. The degree of literacy may be taken as a fair criterion by which to distinguish these two classes. The following statement from the Census Report for 1903, Volume II, page 78, applies to those who were able "to read and write in any language—English, Spanish, or a Malay tongue * * * :"

"Those who were able to read but not write numbered 1,208,845, which was 24.3 per cent, or a little less than one-quarter of all the inhabitants 10 years of age and over. Those able to both read and write numbered 1,002,588, and constituted 20.2 per cent, or about one-fifth of those who were at least 10 years of age. In this part of the population was included a small element who had received superior education. They numbered only 76,627, or 1.6 per cent of the population over 10 years of age."

Those having received a superior education represent fairly closely the higher classes, a discussion of whose characteristics is not attempted in this paper.

Another classification of the Filipino people is that of civilized and wild people. The civilized tribes form 91 per cent of the total population, and of this proportion the Visaya, Tagalog, Ilocano, and Bicol form 46.8, 21.2, 11.7, and 8.2 per cent, respectively, a total of 88 per cent of the civilized people. While these various tribes and classes differ materially in traditions, habits, and dialects, not only with each other but also among themselves, yet the influence of the Spanish church and Government during the past three centuries has created a similarity in customs and in types of dwellings.

Published accounts, both official and unofficial, present such a variety of conflicting opinions regarding the Filipinos as to compel the remark that no general statement—except fundamental truths applicable to all mankind—can be made applicable to all tribes. The numerous dialects and customs characteristic of almost every barrio or small village, the exclusiveness of each settlement or the lack of intercommunication between settlements, the various racial characteristics of the somewhat large mestizo[a] portion of the population, and the broad division between the high and low classes may be sufficient reason for such discrepancies in the opinions of travelers and other observers.

The principal agricultural products of the islands are hemp, or abacá, sugar, tobacco, cocoanuts, coffee, rice, cacao, lumber, dyewood, fruits, vegetables, etc. The principal building materials are poles or bamboo for the framework, nipa palm or grass for the roofing, and the same material or split and woven bamboo

[a] Offspring of mixed parentage. A large percentage have a Filipino mother and a Spanish or Chinese father.

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for the siding, and bejuco or rattan for binding. Nails and bolts are never used in the construction of the simple native dwellings.

The manufactured products throughout the islands for the year 1902 aggregated in value ₱35,097,209, of which 67.2 per cent were made in Manila. The number of persons employed in manufacturing establishments was 34,659. Valuable information on products—both agricultural and manufactured—is contained in the 1903 census of the Philippine Islands, from which Table IV is taken.

TABLE IV.—*Philippine manufactures, by industry groups, 1902.*

Industry group.	Number of separate industries.	Number of establishments.	Capital.	Cost of materials purchased.	Value of products.
All industries	68	2,184	₱36,226,085	₱25,049,452	₱35,097,206
Group 1. Food and kindred products	5	456	1,721,976	2,228,963	3,417,143
Group 2. Textiles	11	230	895,483	776,118	1,600,776
Group 3. Metal products	8	161	1,054,346	460,030	1,296,816
Group 4. Lumber and its manufactures	8	133	2,995,754	1,596,262	3,177,606
Group 5. Leather and its products	4	219	686,135	525,928	1,132,558
Group 6. Printing and allied industries	4	39	1,200,628	230,375	1,115,928
Group 7. Liquors and beverages	2	331	4,427,287	2,478,042	4,787,718
Group 8. Chemicals and allied products	6	92	516,522	233,249	419,244
Group 9. Clay and stone products	4	87	327,716	119,985	615,642
Group 10. Tobacco	2	113	4,500,403	4,339,682	8,740,516
Group 11. Miscellaneous industries	14	323	17,899,840	12,060,418	8,791,259

AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL AVERAGE MONTHLY WAGES.

Industry group.	Total.		Men.		Women.	
	Number.	Wages.	Number.	Wages.	Number.	Wages.
All industries	34,659	₱757,841	27,045	₱670,270	7,614	₱87,571
Group 1. Food and kindred products	2,757	43,698	2,412	40,973	345	2,725
Group 2. Textiles	3,456	47,741	1,924	31,919	1,532	15,822
Group 3. Metal products	1,724	44,669	1,716	44,534	8	135
Group 4. Lumber and its manufactures	2,039	46,822	2,011	46,424	28	398
Group 5. Leather and its products	1,498	34,241	1,337	32,497	161	1,744
Group 6. Printing and allied industries	1,138	40,811	1,051	40,069	87	742
Group 7. Liquors and beverages	2,541	45,210	2,413	44,595	128	615
Group 8. Chemicals and allied products	1,151	26,736	1,066	25,315	85	1,421
Group 9. Clay and stone products	1,393	15,493	1,367	15,159	26	334
Group 10. Tobacco	10,150	138,112	5,223	78,923	4,927	59,189
Group 11. Miscellaneous industries	6,812	274,308	6,525	269,862	287	4,446

Of the total area of the islands, 2,827,704 hectares (about 7,000,000 acres), or 9.5 per cent, is agricultural land, 45.9 per cent of which is under cultivation; 1,162,108 native males, or nearly one-third of the total number of native males, are engaged in agricultural occupations. The Census Report gives a total of 815,453 farms; all but 4.8 per cent of which have an area less than 5 hectares (13.37 acres); 65.3 per cent are less than 1 hectare (2.47 acres); and 35.7 per cent are less than 0.35 hectare, or smaller than a lot 194 feet square.

While the Filipino is engaged in but few occupations, and these mostly of an individual rather than a cooperative nature, statistics show that he can not be correctly regarded as a nonworker or nonproducer. Table V is compiled from the Census Report.

TABLE V.—*Showing percentage of population engaged in gainful occupations.*

Country.	Year.	Percentage—			
		Total population.	Males.	Females.	From 10 to 14 years of age.
Philippine Islands	1903	43.5	57.6	29.4	16.8
Cuba	1899	39.6	68.2	8.8	24.6
United States	1900	36.3	58.7	12.8	14.8
Porto Rico	1899	33.1	56.9	9.9	22.4

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The tools ordinarily used are of the crudest sort and modern machinery has been practically unknown. However, under proper instruction, the native has shown a fair degree of skill in operating more or less complex machinery, such as steam derricks, drills, locomotives, engines, and stone crushers.

As a measure suggestive of the physical strength of the Filipinos, Tables VI and VII have been compiled from the sources indicated. The militia age is from 19 to 59, inclusive; the voting age is from 23 upward.

TABLE VI.—*Records of medical inspections of seamen made by the United States Public Health and Marine-Hospital Service, Manila, P. I., from January, 1904, to July, 1905.*

Age.	Number measured.	Average height.	Average weight.
		Feet. In.	*Pounds.*
14 to 17 years, inclusive	25	5 1.06	96.72
18 years	29	5 3.43	108.43
19 years	31	5 4.57	118.63
20 to 23 years, inclusive	138	5 3.31	115.85
24 to 30 years, inclusive	303	5 3.51	120.30
31 to 40 years, inclusive	267	5 3.09	125.63
41 to 64 years, inclusive	153	5 3.80	134.51

This record is limited to men who were born in the Philippine Islands; it probably involves an error, since a few were doubtless Spaniards and a larger number mestizos. The average heights and weights may therefore be somewhat higher than they would have been had a more accurate determination of race been possible. In any case they are typical of the laboring classes. Table VII has been compiled from records taken of civil-service employees.

TABLE VII.—*Average weight and height of Filipinos, taken from the records of the Philippine civil service board.*

NATIVE KEEPERS AND GUARDS AT BILIBID PRISON.

Age.	Number examined.	Average weight, stripped.	Average height, barefooted.
		Pounds.	*Ft. In.*
19 years	1	100.5	5 3
20 to 22 years	13	113.07	5 4.17
23 to 30 years	15	113.57	5 3.52
31 to 40 years	11	114	5 4.43

NATIVE PATROLMEN IN MANILA POLICE FORCE.

18 years	2	114	5 5.81
19 years	5	119.60	5 5.98
20 to 22 years	27	115.59	5 5.85
23 to 30 years	73	119.32	5 5.61
31 to 40 years	40	125.80	5 5.64

NATIVE GOVERNMENT EMPLOYEES IN THE ORIENTE BUILDING.

17 years	4	83.75	5 1.25
18 years	7	98.57	5 2.78
19 years	9	100	5 4.32
20 to 22 years	21	101.09	5 3.71
23 to 30 years	43	108	5 3.66
31 to 40 years	17	104.70	5 3.08
41 to 50 years	2	114	5 1.02
Total	103		

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A summation of measurements of Bilibid prisoners made by Dr. Folkmar gives the following results:

Number of men, 838; average height, weight, and age, 5 feet 3 inches, 116.8 pounds, and 31 years, respectively. The maximum and minimum ages of men measured were 55 and 20 years, respectively.

The cargadores, or pack carriers, especially of the hemp regions and of the mountains, exhibit remarkable physical development and a high degree of endurance.

The common native food is rice, corn, and dried or fresh fish, with such fruits and vegetables as may be available. It has been demonstrated by the Army, in rationing the Scouts, or native soldiers, that a material increase in strength and endurance results from a more suitable ration similar in character to the Regular Army ration. The adoption of the United States Army Scout ration among the native employees of the Mariveles quarantine station has resulted in a considerable increase in weight and a marked increase in efficiency and endurance.

With American system and methods there may be expected an increase in the use of nitrogenous foods and a proportional increase both in efficiency and in wages.

Statistics show that malarial fevers seriously interfere with the efficiency of labor gangs. Its effects can be successfully met by the use of its specific remedy, quinine, the value of which is slightly known by the native.

Cholera, usually regarded as a filth disease, is sporadic and at times epidemic in its nature. It was prevalent practically throughout the islands during the summer of 1902. It must be combated with rigid quarantine regulations, which, while effective in stamping out the disease, necessarily cause additional expense and delays in prosecuting public works. Improved and rigid sanitary measures will doubtless prevent in a large measure the future ravages of this disease.

Other tropical diseases, as leprosy and bubonic plague, are practically negligible in their effect on labor gangs. Yellow fever is at present unknown.

The board of health is thoroughly organized with an ample and efficient force. During the eleven months ending August 1, 1905, its staffs of medical inspectors had vaccinated 819,439 persons throughout the islands and the presidents of municipal boards of health had vaccinated 164,933. Vaccine units to the number of 3,034,900 were shipped to points throughout the islands. This does not include the records of the Army, Navy, and Marine-Hospital Service, or the work of private physicians. The effective work cited was of a routine nature and was not the result of an epidemic of smallpox. It has, however, practically stamped out this disease previously so prevalent.

Table VIII, from the Philippine census report, shows a comparison between the causes of death in the Philippines and the United States for the year 1902, during which cholera was pandemic.

TABLE VIII.—*Distribution of deaths in the Philippine Islands and in the United States for the year 1902, by principal causes, expressed in percentages of the total number of deaths (condensed).*

Cause of death.	Philippine Islands.	United States.	Cause of death.	Philippine Islands.	United States.
Cholera	31.1	-------	Simple meningitis	0.2	1.2
Malarial fever	26.8	1.4	Erysipelas	.2	.3
Tuberculosis of the lungs	6.6	10.7	Rheumatism	.2	.5
Dysentery	3.7	1.1	Scarlet fever	.1	.6
Smallpox	3.4	.3	Whooping cough	.1	.9
Diarrheal diseases	3.2	3.3	Dengue	.1	-------
Beri-beri	1.3	-------	Cancer	.1	2.8
Diseases of stomach	1.2	1.3	Organic diseases of heart	.1	6.7
Bronchitis	.7	1.9	Pneumonia	.1	10.2
Tetanus	.6	.2	Nephritis and Bright's disease	.1	3.5
Influenza	.4	1.6	Bubonic plague	(a)	-------
Typhoid fever	.4	3.4	Leprosy	(a)	-------
Diphtheria	.3	1.6	Suicide	(a)	.5

[a] Represented.

Table IX shows the average density of population per square mile throughout the provinces.

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TABLE IX.—*Density of population, by provinces, in the Philippine Islands.*

Province.	Area.	Total.	Per square mile.	Province.	Area.	Total.	Per square mile.
	Sq. miles.				*Sq. miles.*		
Albay	1,649.5	240,326	145.6	Moro	28,520.6	380,038	13.3
Ambos Camarines	3,540.1	239,405	67.6	Nueva Ecija	2,127.9	134,147	63
Antique	1,052.5	134,166	127.4	Nueva Viscaya	1,693.2	62,541	37
Bataan	518.9	46,787	90.1	Occidental Negros	3,145.5	308,272	98
Batangas	1,305.8	257,715	197.3	Oriental Negros	1,848.6	201,494	109.1
Benguet	908.3	22,745	25	Pampanga	872.6	223,754	256.3
Bohol	1,510.4	269,223	178.3	Pangasinan	1,889	442,521	234.3
Bulacan	965.3	223,742	231.8	Paragua	5,237.8	35,696	6.8
Cagayan	5,172.5	156,239	30.2	Rizal	898.5	150,923	168
Capiz	1,755.4	230,721	131.5	Romblon	572.6	52,848	92.2
Cavite	708.1	134,779	190.3	Samar	5,276.1	266,237	50.5
Cebu	1,938.4	653,727	337.3	Sorsogon	542.4	120,495	222.3
Ilocos Norte	1,348.3	178,995	132.8	Surigao	7,023.2	115,112	16.4
Ilocos Sur	1,739.8	239,271	137.5	Tarlac	1,231.3	135,107	109.7
Iloilo	2,102.1	410,315	195.2	Tayabas	5,997.8	204,749	34.1
Isabela	4,789.3	76,431	15.9	Zambales	1,589.2	59,930	37.7
La Laguna	666.2	148,606	223.1				
La Union	708.4	137,839	194.7	Total	115,013.7	7,415,498	--------
Lepanto-Bontoc	2,221.3	72,750	32.7	Manila (city)	12.3	219,928	--------
Leyte	3,007.8	388,922	129.3				
Masbate	1,569.2	43,675	27.8	Total, Philippine Islands	115,026	7,635,426	66.4
Mindoro	4,023.7	39,582	9.8				
Misamis	3,346.1	175,683	52.5				

The density of population is dependent upon topographical features and resources. Along the fertile coastal plains and river valleys, where public improvements are first required, the population per unit area is from three to ten times as great as the average population per square mile.

The density of population for the United States proper is 25.6 persons per square mile. The following figures, referring to the principal agricultural regions and the principal manufacturing States, are compiled from the United States Census of 1900, and are given for comparison with those of the Philippine Islands:

Density of population of the United States.

[United States Census, 1900.]

Agricultural States.	Area.	Per square mile.	Manufacturing States.	Area.	Per square mile.
	Sq. miles.			*Sq. miles.*	
Arkansas	53,850	24.7	Connecticut	4,990	187.5
Indiana	36,350	70.1	Illinois	56,650	86.1
Iowa	56,025	40.2	Massachusetts	8,315	348.9
Kansas	82,080	18	New Jersey	7,815	250.3
Michigan	58,915	42.2	New York	49,170	152.6
Nebraska	77,510	13.9	Pennsylvania	45,215	140.1
Wisconsin	56,040	36			

The following brief tables for other countries are presented for the purpose of comparison:

Density of population of certain other countries.

Country.	Area.	Total.	Per square mile.	Country.	Area.	Total.	Per square mile.
	Sq. miles.				*Sq. miles.*		
Cuba [a]	44,000	1,572,797	36	Java [b]	50,554	26,000,000	514
Porto Rico [a]	3,606	953,242	264	New Zealand [b]	104,471	816,000	8
Hawaii [a]	4,990	154,001	31	Sumatra [b]	161,612	3,209,037	19
Japan [b]	161,198	46,588,700	289	Tasmania [b]	26,385	171,066	6
Jamaica [b]	4,200	745,104	177				

[a] Taken from Census, 1899. [b] Taken from International Year Book, 1901.

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Under present conditions contractors and engineers located in the Philippine Islands will find it advantageous to give special instructions to American exporters shipping goods into the Islands, in order that customs regulations may be complied with and unnecessary delays avoided; that goods may be properly protected against serious deterioration from sea water and ordinary handling while in transit; and that essential parts shall not be lost for months in some way port. The American exporter, in comparison with the foreign exporter, is often seriously discredited by importers in the Philippines on account of his lack of attention to these details. He certainly exceeds all others in the careless packing of export goods.

Outside of the larger cities transportation by land is expensive on account of the lack of local facilities and the condition of highways, and the contractor will find it economical to organize and control the necessary transportation equipment. The Government is pursuing a progressive policy relative to the improvement of the highways. Water transportation has furnished the most important means of conveyance for centuries. A large percentage of the inhabitants are skilled in the use of the various small native crafts. Coastwise vessels are too limited in both size and numbers to meet the present demands; they are owned and operated mainly by local firms. Important legislation and improvements relative to coastwise commerce are now in progress and will be completed early in 1906.

The following statements are compiled from reports by the provincial supervisors, and are the average figures from thirty-six provinces. They relate only to the expenses of American officials assigned to one location for at least several months. Incidental expenses include hire of servant, laundryman, keeper of horse, etc.

	U. S. currency.
Subsistence per month averages	$32.00
Lodging per month averages	10.50
Incidentals per month average	15.00
Total	57.50

Superintendents of construction works and civil engineers in charge of field parties purchase subsistence supplies in bulk, they are quartered in tents or nipa shacks, and purchase locally fruits, vegetables, chickens, eggs, etc., whenever practicable. Subsistence expenses per month for Americans average $27, and for native laborers about $5.

Tables XI to XIV have been prepared from the most reliable available sources. Abnormal conditions have prevailed since the American occupation. Until recently the currency of the islands has been on a fluctuating silver standard. Fluctuations as high as 30 per cent within a few weeks have been known. The currency of the islands, however, is now firmly established on a gold standard, the unit of value being the peso, which is equivalent to 50 cents United States currency. Rentals have been excessive and all items entering into the cost of living, except clothing, have been abnormally high. During 1905 the market value of rentals and of foodstuffs is materially lower than during the period 1900 to 1905, and it can be reasonably anticipated that, with increased interisland and trans-Pacific service, and equitable tariff relations established with the United States, the previously excessive cost of living will not again prevail. The value of these tables is of importance mainly in showing the prices prevailing previous to 1905.

TABLE XI.—*Maximum and minimum wholesale prices of foodstuffs.*

[Mexican currency. From Smith, Bell & Co.]

Foodstuff.	1890.		1895.		1900.		1905.	
	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.
Saigon rice ... picul [a]	$3.50	$2.69	$4.00	$3.19	$5.55	$4.65	$5.60	$4.60
Flour ... do	8.75	8.25	9.75	9.00	[b] 13.50	[b] 11.50	[b] 11.75	10.40
Refined sugar ... 200 pounds	12.00	7.50	10.50	8.00	16.00	14.00	13.50	10.00

[a] One picul equals 136 pounds. [b] Warner, Barnes & Co.

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TABLE XII.—*Comparative retail prices of foodstuffs in Manila.*

Item.		1897.	1898.	1901.	1904.	1905.
		Pfs.	*Pfs.*	*Pfs.*	*Pfs.*	*Pesos.*
Sugar	arroba	1.82	2.50	2.94	3.50	3.00
Rice	do	2.00	3.00	3.00	3.50	3.50
Spanish peas	do	5.00	7.50	7.00	7.00	8.00
Beans	do	2.00	3.00	4.00	4.00	3.50
Coffee	do	8.00	10.00	10.00	10.00	9.00
Potatoes	do	.75	5.00	1.36	2.00	1.50
Onions	do	2.00	6.00	3.00	3.00	1.50
Codfish	do	4.00	6.00	7.00	8.00	6.25
Red wine	do	3.00	4.00	6.00	6.00	5.00
White wine	do	4.00	5.00	7.00	20.00	7.00
Sherry	case	11.00	11.00	16.00	22.00	18.00
Vinegar	arroba	3.00	3.50	4.50	5.50	7.00
Vinegar	bottle	.37	.50	.50	.50	.40
Olive oil	arroba	4.00	5.50	7.50	7.50	5.75
Olive oil	bottle	1.00	1.50	1.50	1.50	.90
Alcohol (36)	do	.25	.37	.37	.50	.50
Pickles	do	.50	.75	.87	1.00	.50
Olives	do	.50	.50	.70	1.00	.60
Olives	firkin	1.00	1.50	1.50	2.00	1.25
Lard	arroba	4.00	5.00	6.00	7.60	5.00
Canned butter	pound	.75	1.00	1.12	1.25	.60
Kerosene	10-gallon case	4.00	5.50	5.00	5.00	3.20
Bacon	pound	.37	.50	.55	.62	.45
Soda biscuit	can	1.25	1.75	2.00	2.00	.50
Canned sardines	do	.10	.20	.20	.50	.15
Canned fish	do	.37	.50	.75	.75	.50
Canned meat	do	.62	.75	1.00	1.25	.50
Canned sausage	do	1.00	2.00	1.50	1.50	.45
Canned pork	do	2.50	2.50	3.25	3.50	2.00
Canned sugar	do	.75	.87	1.00	1.25	1.20

NOTE.—An arroba equals 25 pounds. Pfs. is the designation for Mexican currency, and pesos for the new Philippine currency.

TABLE XIII.—*Imports and exports of foodstuffs, Philippine Islands, American period.*

[From Third Special Report of the Philippine Customs.]

	1901.	1902.	1903.	1904.
IMPORTS.				
Cattle, hogs, sheep	$77,413	$487,326	$740,076	$844,482
Breadstuffs	746,187	923,540	912,087	1,096,332
Cocoa, coffee, tea	199,899	301,859	318,834	276,593
Opium	619,338	819,625	721,551	770,596
Eggs	285,239	276,085	294,414	282,074
Malt liquors	1,042,594	547,517	488,131	310,411
Beef, fresh	19,286	31,518	82,155	204,262
Hog products:				
Hams, shoulders	110,744	157,663	155,130	167,181
Lard	92,139	120,059	185,894	262,140
Condensed milk	97,287	155,595	247,366	251,261
Rice	5,490,958	6,578,481	10,061,323	11,548,814
Spirits	411,859	510,258	307,681	227,578
Wines	347,216	390,393	258,912	266,663
Vegetables	328,674	686,254	412,904	432,578
Canned goods	112,430	286,191	233,673	282,599
Fruits	114,644	146,963	78,407	87,986
Olive oil	36,370	30,863	46,977	41,835
Cheese	58,987	40,633	43,959	38,518
Butter	88,446	62,563	48,401	56,583
Fish	53,542	81,348	52,152	112,201
EXPORTS.				
Sugar, raw or brown	2,298,058	2,761,432	3,955,828	2,668,507
Coffee				
Rice				

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TABLE XIV.—*Comparative cost of foodstuffs in Manila.*

	1897.	1900.	1904.	1905.
	Pfs.	*Pfs.*	*Pfs.*	*Pesos.*
1 pound meat without bone	0.25	1.50	0.60	0.30
1 sack of first-class rice	2.50	5.75	7.50	6.50
1 pound of pork	.20	.50	.70	.40
1 chicken	.15	.50	.60	.75
1 hen	.50	1.25	1.50	1.25
1 piece of bread	.01	.04	.04	.02
1 measure of milk	.05	.15	.25	.20
2 buckets of water	.01	.05	.05	.04
1 pound of fish	.12	.25	.50	.25

NOTE.—Pfs. is the designation for Mexican currency, and pesos for the new Philippine currency.

The average value of the Mexican peso for the years involved in Tables XI, XII, XIII, XIV follows:

Average value of Mexican peso in United States currency.

1890	$0.8368
1895	.552
1897	.5024
1898	.4711
1900	.4918
1901	.4872
1902	.424
1903	.419
1904	.4671
1905	.50

NOTE.—The value of local peso in above table, in terms of United States currency, was computed by Dr. E. W. Kemmerer, chief, division of the currency, on the basis of average daily sterling exchange rates in Manila, reckoning 4.8665 to the pound sterling. The new Philippine currency was adopted in 1904, one peso (₱1) being equivalent to $0.50, United States currency.

In general the Filipino is a Malay, modified, except in the Moro, to a considerable degree by the influence of centuries of association with other races, and more particularly by the civilizing influences of the church and the Government of Spain.

Nature has freely endowed the islands with food available with a minimum of effort through the year. She does not require that provisions be made for an extended winter; nor is there a season during which some food stuffs are not procurable in the field. That thrift characteristic of inhabitants of higher latitudes is entirely lacking in the average Filipino. He has been subjected by foreign races, and through the necessity of existence he has become highly skilled in both detecting and practicing deception. He has been required to defend his family from pirates and ladrones. He has, perhaps, in past times, played the part of both. As a result he is a mass of contradictions, and is, in general, proud, hospitable, indolent, and unreliable. His family ties are strong. He is imitative and quick to learn, but his capacity remains to be determined. He may be defined as a child in whom the faculties and habits are not fully matured. As a laborer it is an absolute necessity that he receive patient, careful instruction and efficient supervision from a superintendent or foreman acquainted with his characteristics; that he clearly understands the orders given; that the demands placed upon him be within his ability; that he be instructed from the first in the right way to perform new duties, and be not required to unlearn lessons or methods previously taught. He is quick to recognize efficiency and justice in his employer, and to repose confidence in the foreigner possessing these traits. He is favorably impressed by an outward show of wealth and influence. The custom of English commercial firms upon entering new fields of operations is to construct ample warehouses and residences for their representatives. These buildings are generally the most substantial and best furnished in the town. They could be easily fortified to resist attacks by mobs. This plan not only provides for the security and

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efficiency of the representatives of the firm, but it pays as an advertisement as well—it creates in the minds of the surrounding inhabitants confidence, and inspires a desire to trade with a firm of such evident wealth and power.

The employer of a considerable number of men for a period of several months must provide for the sanitation, subsistence, amusements, and religion of the employee and his family.

A brief description of the employees' settlement at the quarries of the Atlantic, Gulf and Pacific Company will clearly illustrate this point. This firm has under prosecution the contract for the Manila breakwater and harbor dredging, the total cost of which will be approximately $4,000,000. The quarries are located on the westerly shore of Manila Bay, about 25 miles from the harbor works. The employees consist principally of about an equal force of Tagalo and Pampangans. The contractors have an experienced and efficient superintending force. They have provided pure water for the settlement and enforced regulations relating to sanitation and policing; gambling is prohibited inside of the houses. About 700 employees are engaged; 150 houses have been built for their families; and material for a church has been furnished, the labor having been provided by the settlement, and the erection superintended by the contractor. A cockpit and dance hall were built, and the time of attendance regulated; the children have been provided with a school, and the services of a native teacher have been secured through the Bureau of Education; a store for the supplies demanded by the settlement has been established, at which necessary goods are sold at practically cost prices, and the paymaster, if desired, acts as banker for the more thrifty employees. The cost of these provisions for the needs and pleasures of the employees has been comparatively small by reason of the fact that the materials of construction have been available locally. The amount of common sense and the practical knowledge of the native characteristics shown by this company has been large. As a result of the above-mentioned provisions, and by a process of elimination, selected laborers have been secured for long periods of service, and they have been trained to considerable efficiency in lines requiring semiskilled labor. Mr. H. Krusi, vice-president of the company in charge of this work, states that native labor is entirely satisfactory. In view of large contracts under advertisement, he declines to give at present detailed information on the efficiency or unit output per day of the native laborers.

A large portion of the data presented relative to the facility in securing labor, its efficiency, and wages paid applies to Manila and its vicinity. The best information available on labor throughout the provinces may be secured from an examination of the reports of the provincial supervisors, who are, as a rule, trained civil engineers, and whose official duties require them to organize and superintend all public works in the provinces. They are generally engaged on projects financed with insular, municipal, or provincial funds.

Wages in Manila and vicinity and in the hemp regions average about one peso (50 cents) per day. The average rate through the provinces is somewhat less than one-half peso; during the planting and harvesting seasons labor may be scarce, and difficult to secure at somewhat higher prices, but lower rates prevail during the remainder of the year.

In general it may be noted that the hire of labor, as well as the purchase of local material, can be accomplished more readily when small rather than large quantities are required; the difficulties to the Filipino contractors in the organization and prosecution of the larger projects are materially increased, and they refuse to undertake such contracts.

Experience in handling the larger projects has not yet been acquired, although there is a favorable tendency to a more successful meeting of such demands. In other words, laborers in small numbers can be readily secured for short periods of time; laborers in large numbers for continuous service are difficult to secure, and require tact and skill in providing with such conveniences, amusements, and home life as are necessary to hold the laborers for long periods. When such local amusement or relaxation is not provided the Filipino laborer leaves his work at frequent intervals to visit his home and friends, for fiestas, and for the harvesting and planting of crops.

The following abstracts from the reports of the supervisors for the past fiscal year on the question of unskilled labor are typical; it is probable that over 60,000 different native laborers have been employed during the past year by these officials:

"*Neuva Ecija.*—During the past year I have had little trouble in securing labor whenever desired. During the rice-harvesting season it is more difficult to

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obtain labor than at other seasons, as laborers receive more in proportion for harvesting rice than at other work. As a rule, it is difficult to obtain carabaos and carts for public work; and during about eight months of the year it is practically impossible to get them at any reasonable figure—this during rice planting and harvesting seasons. To meet these conditions the province has purchased carts, American mules and wagons, and I have made log wagons and other vehicles for use on public works.

"A marked improvement is noticeable in semiskilled native labor, if properly directed for any considerable length of time. * * * I do not think that it would be questioned that labor conditions at the present time are superior to those at any previous period since American occupation.

"*Batangas.*—Natives were almost entirely employed on all public works. * * * Economic conditions in the province are such at present that no difficulty was encountered in securing the necessary number of laborers at the rate (40 cents) specified. It is evident, however, that within the course of a year or two agriculture will have recuperated to such an extent that wages will be considerably higher as the demand for labor increases.

"*Rizal.*—Hundreds of laborers found employment at Fort McKinley as painters, carpenters, and ordinary laborers at good wages, and at times I had difficulty in getting labor for my road work. The lowest wage paid for labor at Fort McKinley is 80 cents per day, but the men are paid off but once a month. By paying the men weekly I am enabled to get labor at 60 cents, and they will quit work at 80 cents to work for me at 60 cents, in order that they may get their money more quickly.

"*Tayabas.*—While it is difficult to procure a large force of laborers and hold them together, still small gangs of 100 to 200 men can usually be kept at work except during the season of sowing and harvesting the rice crop; at such times the force dwindles down, and it is only by constant exertion that enough men can be secured to keep the work going. However, I never have as yet been obliged to shut down on account of not having sufficient men with which to do something. It is a matter of record that the people of Tayabas Province do not care to work on the roads, this probably being due to the fact that there is usually enough work to be found in looking after the numerous cocoanut plantations.

"The best way to keep even such small gangs together is to pay them frequently, say, at least every two weeks; then have pay day on Sunday morning early; most of the men will spend their money during the day, and having no means of subsistence will return to work on Monday, as they are at least assured of their daily rice by so doing. These laborers, under intelligent foremen, accomplish a good day's work—left to themselves under native *capataces*, they are not to be depended on for one moment."

The following abstracts are taken from the report of Maj. L. W. V. Kennon, United States Army, in charge of the Benguet road construction:

"The Filipino makes a tolerably good workman when trained and properly supervised. The class of work required on the Benguet road was new to him and he went at it awkwardly enough at the start. Each laborer was patiently shown by a foreman how to use his tools and how to accomplish most with the least effort. Most of them attained a fair degree of efficiency and soon became good workmen.

* * * * * * *

"It may be said that after becoming inured to the work, the Filipino, considering his wage and ration, was the most economical laborer employed on the road for ordinary work. Skilled supervision is essential, however. The opinion is ventured that the Philippine Islands may be developed by native labor alone under suitable conditions. Time, tact, patient instruction, and fair dealing will accomplish much; the personal equation enters very largely into the problem. * * *

"The great variety of workmen employed on the road gave opportunity for a comparison of the relative working value of the several races. The American or European, by reason of his strength, and especially by the intelligent direction of his strength, is superior to all other workmen and could accomplish more in a given time than any other. Americans were, on their merits, selected generally as foremen of the various grades.

"Spaniards were among the very best laborers employed—steady, constant, industrious, and hard working always.

"The Japanese were superior workmen. They were intelligent and worked well when watched. They were fearless and active on cliff work. They fur-

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nished many carpenters and stone masons; most of them could be called upon to lay walls or to do stonework of almost any kind.

"The Chinese did not turn out well and the 500 which reported were soon reduced to about 200. The majority were confirmed opium smokers and of little value as laborers and were discharged. The selected few that remained were good workers and more adaptable than Filipinos. * * *

A few concrete examples may be of value in illustrating the labor problem. The deputy surveyor of customs, Manila, in charge of lighterage, submits the following statement:

"My experience has been that the Filipinos make good laborers, but only on condition that a very liberal number of foremen and superintendents be put over them, and that white men be employed as chief superintendents to do all the brain work, such as planning, directing, and other executive duties. Filipino foremen of a grade of intelligence several degrees above the laborers are necessary in liberal numbers, but these also have their limitations when it comes to head work and anything out of a routine.

"The average force in the arrastre division consisted of—

		U. S. currency.
150 laborers	per day	$0.45
4 stevedores (3 Filipinos, 1 Chinese)	per month	20.00–25.00
6 stationary engineers	do	17.00
2 locomotive engineers	do	21.00–25.00
2 firemen	do	10.00
3 machinists	do	12.50–25.00
1 carpenter (Chinese)	do	25.00
14 warehousemen	do	15.00
12 openers and packers	do	15.00

"The superintendency for this force was one American at $1,600 per year, and three Spanish citizens of the islands at salaries of $900, $840, and $600, respectively.

"The unskilled laborers are paid each week; the skilled each month. About one-fourth of the unskilled laborers are quite regular, and another fourth fairly so; the others come and go. Three-fourths to seven-eighths can not read or write. They generally lack intelligence. If more intelligent laborers could be procured, better wages could with economy be paid. It is not considered that the laborer at 45 cents gold a day is cheap. American laborers at three times the wages would be no more expensive; neither is the skilled labor cheap. The amount of work done is not large per man compared to American standards, and the large amount of superintendence necessary, comparatively speaking, does not make this class of labor specially cheap. There is no trouble in securing laborers. Half of my force is Tagalog and half Pampangan. They are kept separate. The two do not affiliate, and there is no danger of a combination and strike as happened two years ago when all were Tagalogs."

Mr. D. M. Carman, of the firm of Carman & Co., Manila, is one of the first Americans to handle comparatively large forces of natives. He states as follows:

"During a period of over five years I had in my employ, and much of the time under my immediate observation, a large number of native and Chinese laborers. This number ranged from 300 to about 2,000, and included stevedores, wharfmen, warehousemen, teamsters, lightermen, launch captains, engineers, machinists, carpenters, masons, bookkeepers, freight checkers, superintendents, and managers. There are no especial arrangements for housing or feeding any of these.

"It was our custom to work a few gangs of Chinamen by the side of the Filipinos. Thus we were enabled to compare the character and the amount of work done by each.

"At the custom-house we invariably paid the Chinamen a few cents per day more than the native, as that was necessary to secure their services. While I was always convinced that the natives gave us as much work for the money paid them as did the Chinamen, we retained the latter as a check on the former. With the exception of the coal handlers and the carpenters the Filipinos gave as good satisfaction as the Chinamen. They were not strong enough to carry the heavy baskets of coal continuously and were not trained to do carpentry work. The engineers, machinists, and captains of launches were very satisfactory, some of them remaining almost constantly at work for over

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four years with few holidays and no vacations. One engineer and one captain were on one launch for nearly four years without the loss of a month's time. In the early days of American occupation there was great difficulty in keeping men at work holidays, of which there were 157 in the year, and it was almost impossible to induce them to work overtime, but after the first few months that trouble almost entirely ceased. I believe that the following incident had more to do with the somewhat sudden change in this particular than anything else. Noticing that the petty bosses were in the habit of striking men when they did not obey promptly, or when they were at all insolent, I gave notice that any man who struck an employee would be discharged.

"Shortly after issuing this one of the most important overseers hit a man and was immediately discharged. From that time there seemed to be a marked change in the feelings of the men and we seldom had trouble in inducing them to work overtime and holidays. I mention this because I have become firmly convinced that one of the secrets of securing reasonably efficient and willing service from Filipinos is the proper treatment of them.

"I employed but few white foremen, and some of the best bosses were natives. One of these has been in charge of the work on the custom-house wharf for several years, never so far as I know having been away from his post a day, except for a week or so during a misunderstanding with the Spanish foreman, in which the latter was at fault.

"In order to indicate the possibilities of development in the Filipinos, I desire to refer to a man who began to work at 40 pesos a month, and within three years managed one large department at a compensation of $250 gold per month. This man did his work with a faithfulness, honesty, and competency that was exceptional.

"While it is true that the Filipinos are not physically able to do as much or as hard work as similar classes of workmen in the United States, it is my belief that as much light work can be gotten out of them for a dollar as can be secured for a like sum from any ordinary set of men anywhere."

Mr. H. A. Belden, manager of J. G. White & Co., has completed the construction and equipment of the Manila Electric Railway system, and with few exceptions is employing native conductors and motormen. He states:

"We have had to employ more foremen than we would have found necessary in the United States, but the cost has been nowhere what we expected and for which we provided in our estimates. We had been told that it would take a half dozen Filipinos to do the work we would expect to be done by an American laborer. Results have shown, however, that the ratio of efficiency is about three to one.

"We had figured on securing what Chinese and Japanese laborers we could pick up around Manila. But we decided to first give the Filipinos a thorough trial, and, as I said, the results have been excellent. We employed a few Chinamen for doing the riveting work on the power house—work at which they are supposed to excel—but we have discharged them and have employed natives in their places. Even here the natives prove themselves far the better workmen."

In response to an inquiry from the civil government the following statement was submitted by Mr. Krusi, to whose work reference has been previously made:

(1) We believe that Filipino labor can successfully be used. We are employing about 1,000 Filipinos, which is a practical demonstration that this statement is not a theory.

(2) To employ successfully Filipino labor is, to the American employer of labor, a new business which has to be learned. If he can not learn it, he can not do business in the Philippine Islands.

(3) In general the Filipinos have to be taught to work. This requires a considerable proportion of intelligent, high-grade American foremen and mechanics.

(4) The way to keep the Filipino laborer permanently in one's employ is to arrange his surroundings so that he is better off and more contented there than anywhere else. This we have attained by means of providing homes for the Filipinos and their families, also amusements, including Sunday fiestas and schools where their children may be educated.

(5) We are opposed to the introduction of the Chinese. The only argument is that it may somewhat expedite the development of the resources of the islands. This temporary advantage is, we believe, overbalanced and overwhelmed by the ultimate injury to both the Americans and natives in the islands.

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(6) We believe that the greatest need of the islands is the abolition of the Dingley tariff as far as it applies to the Philippines. We want the American market, not the Chinese labor.

The above two firms are to-day the largest representative American contractors doing business in the islands, and their projects have been described in previous issues of the Engineering News.

Mr. H. L. Higgins, general manager of the Manila Railway, a line having a 3½-foot gauge, and extending from Manila to Dagupan, a distance of about 120 miles, is constructing about 82 miles of extension to the present system. The constructing as well as the maintenance and operating forces are composed entirely of Filipinos, except the superintendency. The permanent works require the services of about 1,300 men. Mr. Higgins has had no serious difficulty in securing laborers for new works. He states that on the new works the average period of service is about one month; that pay days occur weekly, and that wages average 50 centavos, Philippine currency, per day. When the work is remote from the base of supplies a commissary is established which sells necessities at prices generally under the market; no goods are sold except to laborers, and they are under no obligation to buy. No shelter has been provided laborers except when company buildings were available. Mr. Higgins estimates that in medium excavation the Filipino will handle 15 cubic meters (19.5 cubic yards) per day; that the output per dollar expenditure compares favorably with the output of American labor, and that under improved methods and proper instruction the output will increase more rapidly than wages. On account of difficulty in securing Filipino labor in 1890, 500 Chinese were employed, at a loss in quantity and quality of work accomplished as compared with Filipino laborers. Native laborers are free from drunkenness and do not wantonly destroy property. They require efficient supervision.

The native is desirous of being his own "boss," and small contracts or section work can be let to advantage. On such work he shows perhaps double the efficiency shown on day labor. It is not uncommon for him to sleep during the middle of the day, and to work for several hours at night, either by the light of bonfires or during the brilliant moonlight nights. Ordinary tools are generally furnished by the company; otherwise he uses a sharpened bamboo stick for a pick or bar and loads the material with his hands into small baskets, which are carried on the head, or he may throw the dirt with his bare hands from pit to spoil bank. His methods and tools are of the crudest types, but he is rapidly appreciating the utility of the simpler tools. On such small section work the entire family—men, women, and children—take part.

The various departments of the military have employed large numbers of natives and their published reports are in general favorable to the economical prosecution of works requiring semiskilled and unskilled laborers as compared with similar American laborers. The comparative efficiency is reported as approximating 3 native to 1 American laborer. When laborers of other nationalities have been employed, they have been replaced with native laborers, not on account of a governmental policy, but for economical reasons.

In the past it has been difficult to secure laborers from other nearby localities on account of the then existing caciquism or the generally despotic control of a barrio by a man who arbitrarily exercised the rights of a petty king. While this condition is still in evidence, it is being rapidly overcome by American policies.

Filipino labor is in a period of transition. It needs the application of American ideas, methods, energy, and supervision. The advances already made are encouraging to those actually engaged in solving the labor problem in the Philippines. That it will be successfully solved through the employment of Filipinos rather than of people from neighboring countries is not doubted by practical observers on the ground.

The bureau of engineering has employed thousands of laborers throughout the islands on road and bridge work. During the past year it has been possible to extend the period between pay days from one day to two weeks, and service has been extended from a period of a few days into months. The efficiency of laborers is increasing and a knowledge of ordinary tools extending. Semiskilled labor has been satisfactorily developed. In many localities labor gangs have been secured for work in remote municipalities or other provinces. Laborers of other nationalities have not been employed in sufficient numbers to justify a general comparison. Of the 40,000 Chinese in the islands few are available for ordinary laborers; they come to the islands for definite purposes, they are the pioneers of their nation, they seek to be traders and retailers, and begin in the smallest ways; they persistently retain national characteristics

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and methods, and avoid supervision by other nationalities. Japanese are not now available in quantities sufficiently large to meet the needs of extensive contract work.

Specific information on the efficiency of native semiskilled and unskilled laborers has been difficult to secure. They seek clerical positions as soon as ability to read and write has been acquired. As typewriters they equal Americans when copying from a plain copy. As tracers they excel the American draftsman in neatness, and perform about one-third as much work; at present they can not make an accurate structural drawing from a rough sketch. They are efficient when deftness of hand and patience is required, but fail when designing and forethought are necessary. They are good messengers, and, after proper instruction, efficient rodmen and surveymen. The principal difficulty is that they can not be depended upon for continuous service in the field month after month. In the office, in the vicinity of their homes, regular continuous service is given, and considerable success attained in developing the educated native in the solution of the simpler problems involving logarithms.

The following tabulations have been compiled from actual records of work in the city of Manila and in the provinces, and are the averages on both government and private works. The wages quoted apply to Manila and its immediate vicinity, and are expressed in Philippine currency.

Average day's work and wages of laborers in Manila.

Class of work.	Daily wage.	Average day's work of one laborer.
Rock excavation (adobe)	₱1.00	1.1 cubic meters.
Earth excavation	1.00	2.1 cubic meters.
Back filling	1.00	6.3 cubic meters.
Cement curbs	1.50	2.1 linear meters.
Cement sidewalks (by hand)	1.50	1.8 square meters.
Crushing stone (by hand)	1.00	1.1 cubic meters.
Laying wooden-block pavement in concrete	1.00	0.67 square meter.
Trenching (shallow)	1.00	1.8 cubic meters.
Laying pipe	1.00	4.1 meters.
Unloading and storing merchandise	.80	4.9 tons.
Typesetting	2.20	3,000 ems.
Engraving	4.50	3 name plates.
Bookbinding	1.00	1,000 sheets.
Field riveting	.80	125 per day.
Cigar makers, hand		100 per day.

An analysis of these items shows that the actual cost of labor for work accomplished is in general the same as in the United States, and that the relative efficiency of native, as compared with American, laborers averages about three to one.

The following data are compiled from the records of the city of Manila and represent the averages for the work specified over a period of one year:

Average cost of labor.

Street cleaning, average of all kinds	per 1,000 square meters	₱0.155
Stone block	do	.23
Wooden block	do	.22
Macadam	do	.105
Sprinkling with cans and hose	do	.10
Collecting and cleaning pails	per 1,000 pails	45.00
Garbage	per 1 ton	.48
Incinerating garbage	do	.61

For the above items eight hours constitute a day's work. The labor scale is:

American foreman	₱6.00–7.00
Native foremen, street cleaning	1.20
American teamsters, pail system	4.00
Native teamsters, collecting garbage	1.30
Native labor, unskilled	.60–1.00

On new construction for the Manila Railway Company, a typical labor gang on rock excavation, after the rock had been blasted into fragments varying in size up to 4 cubic meters (5.3 cubic feet), loaded 18 dump cars having a capacity

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of 4½ cubic meters in one and one-half hours. The gang consisted of 1 American, 2 native foremen, and 76 laborers, 60 of which were actually engaged in loading and 15 in breaking the fragments too large to lift by hand. The loading was done with shovels, the rock averaged 10 feet from the edge of the car, and the car platform was about 5 feet above the bottom of the pit.

The wage scale was:

American foreman	₱5.00
Native foreman	1.00
Native laborers	.80

The rock handled was a soft "adobe" rock, easily fractured by pick or sledge and weighing about 100 pounds per cubic foot.

Mr. John Gibson, of the Gibson saw and planing mills, submits the following statements regarding rough sawing from the log: Eight men at ₱1.56 per day and 25 men at ₱0.80 per day saw 12,000 feet B. M. at a cost of ₱2.71 per 1,000; 3 men at ₱1.00 and 4 men at $0.80 resaw 20,000 feet B. M. at a cost of ₱0.3 per 1,000; 1 man at ₱1 and 6 men at ₱0.80 plane in one day 17,000 feet B. M. at a cost of ₱0.34 per 1,000. He states that in general the cost of millwork is about the same as in the United States, but that the laborer is more satisfactory, as he is steadier and more tractable.

The period since American occupation has been fruitful with heavy problems. It has been filled with difficulties due to the abnormal conditions following active warfare and insurrection. The problems confronting Congress were new, and the theories advanced untried by any country.

American motives had not been trusted by the Filipinos. Criticisms both from within and outside of our borders have been based on perverted motives rather than helpful ones. The political obstructionist has been convinced in a large measure; a fluctuating currency has been banished; radical changes in governmental and in business policies have occurred. It has been a critical period of vital importance to both of the interested countries. Neither fully understood the other. It will be impossible for such adverse conditions to exist again simultaneously. The uncertain policy of the United States has been changed to definiteness, and the future policy has been clearly stated by the statesmen who visited the islands during the past summer, and existing laws will be amended along the lines of a clearly defined policy whenever necessary, and future laws based thereon.

The cost of living and the expenses connected with the prosecution of public works have been abnormal. The tendency toward a firmer market and reasonable profits during the present year has been marked. It may be properly concluded that ample labor material, capable of considerable development under efficient supervision, is available, and that, in general, although the prosecution of large public works in the Philippines involve several conditions not applicable to similar work in the United States, they can be accomplished with practically equal economy at the present time, and that with a more extended knowledge of existing conditions on the part of the employer and more experience on the part of the employee such works can be accomplished in the near future with somewhat greater economy.

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